Scheda di Dati di Sicurezza

Conforme all'Allegato II del REACH - Regolamento (UE) 2020/878

SEZIONE 1. Identificazione della sostanza/miscela e della società/impresa

1.1. Identificatore del prodotto

Denominazione	**D-LIMONENE**
Numero CE	**232-433-8**
Numero CAS	**8028-48-6**
Numero Registrazione	**01-2119493353**

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

Descrizione/Utilizzo	**aroma/fragranze. uso industriale**

1.3. Informazioni sul fornitore della scheda di dati di sicurezza

Ragione Sociale	**Andrea Gallo di Luigi Srlu**
Indirizzo	**Via Erzelli 9**
Località e Stato	**16152 Genova - Italia -**
Telefono	**010 6502941**
E-mail della persona competente, responsabile della scheda dati di sicurezza	**regulatory@andreagallo.it**

1.4. Numero telefonico di emergenza

Per informazioni urgenti rivolgersi a

CAV “Osp. Pediatrico Bambino Gesù” Dip. Emergenza e Accettazione DEA Roma 06 68593726
Az. Osp. Univ. Foggia Foggia 800183459
Az. Osp. "A. Cardarelli" Napoli 081-5453333
CAV Policlinico "Umberto I" Roma 06-49978000
CAV Policlinico "A. Gemelli" Roma 06-3054343
Az. Osp. "Careggi" U.O. Tossicologia Medica Firenze 055-7947819
CAV Centro Nazionale di Informazione Tossicologica Pavia 0382-24444
Osp. Niguarda Ca' Granda Milano 02-66101029
Azienda Ospedaliera Papa Giovanni XXII Bergamo 800883300
Azienda Ospedaliera Integrata Verona Verona 800011858

SEZIONE 2. Identificazione dei pericoli

2.1. Classificazione della sostanza o della miscela

Il prodotto è classificato pericoloso ai sensi delle disposizioni di cui al Regolamento (CE) 1272/2008 (CLP) (e successive modifiche ed adeguamenti). Il prodotto pertanto richiede una scheda dati di sicurezza conforme alle disposizioni del Regolamento (UE) 2020/878.
Eventuali informazioni aggiuntive riguardanti i rischi per la salute e/o l'ambiente sono riportate alle sez. 11 e 12 della presente scheda.

Classificazione e indicazioni di pericolo:

Liquido infiammabile, categoria 3	H226	Liquido e vapori infiammabili.
Pericolo in caso di aspirazione, categoria 1	H304	Può essere letale in caso di ingestione e di penetrazione nelle vie respiratorie.
Irritazione cutanea, categoria 2	H315	Provoca irritazione cutanea.
Sensibilizzazione cutanea, categoria 1B	H317	Può provocare una reazione allergica cutanea.
Pericoloso per l’ambiente acquatico, tossicità cronica, categoria 2	H411	Tossico per gli organismi acquatici con effetti di lunga durata.

2.2. Elementi dell’etichetta

Etichettatura di pericolo ai sensi del Regolamento (CE) 1272/2008 (CLP) e successive modifiche ed adeguamenti.

Pittogrammi di pericolo:

SEZIONE 2. Identificazione dei pericoli ... / >>

Avvertenza: Pericolo

Indicazioni di pericolo:

H226	Liquido e vapori infiammabili.
H304	Può essere letale in caso di ingestione e di penetrazione nelle vie respiratorie.
H315	Provoca irritazione cutanea.
H317	Può provocare una reazione allergica cutanea.
H411	Tossico per gli organismi acquatici con effetti di lunga durata.

Consigli di prudenza:

P210	Tenere lontano da fonti di calore, superfici calde, scintille, fiamme libere o altre fonti di accensione. Non fumare.
P331	NON provocare il vomito.
P280	Indossare guanti / indumenti protettivi e proteggere gli occhi / il viso.
P301+P310	IN CASO DI INGESTIONE: contattare immediatamente un CENTRO ANTIVELENI / un medico / . . .
P370+P378	In caso d'incendio: utilizzare . . . per estinguere.
P273	Non disperdere nell'ambiente.

Orange, sweet, ext (orange oil, sweet, terpenes and terpenoids)
N. CE: 232-433-8

2.3. Altri pericoli

La sostanza non ha proprietà di persistenza, bioaccumulazione e tossicità (PBT) e non è molto persistente e molto bioaccumulabile (vPvB).

La sostanza non ha proprietà di interferente endocrino.

SEZIONE 3. Composizione/informazioni sugli ingredienti

3.1. Sostanze

Contiene:

Identificazione	**Conc. %**	**Classificazione 1272/2008 (CLP)**
Orange, sweet, ext (orange oil, sweet, terpenes and terpenoids)		
INDEX	100	**Flam. Liq. 3 H226, Asp. Tox. 1 H304, Skin Irrit. 2 H315, Skin Sens. 1B H317, Aquatic Chronic 2 H411**
CE 232-433-8		
CAS 8028-48-6		
Reg. REACH 01-2119493353		

Il testo completo delle indicazioni di pericolo (H) è riportato alla sezione 16 della scheda.

SEZIONE 4. Misure di primo soccorso

4.1. Descrizione delle misure di primo soccorso

In caso di dubbio o in presenza di sintomi contattare un medico e mostrargli questo documento.
In caso di sintomi più gravi, chiamare il 118 per ottenere soccorso sanitario immediato.
OCCHI: Rimuovere, se presenti, le lenti a contatto se la situazione consente di effettuare l'operazione con facilità. Lavarsi immediatamente ed abbondantemente con acqua per almeno 15 minuti, aprendo bene le palpebre. Consultare subito un medico.
PELLE: Togliere immediatamente tutti gli indumenti contaminati. Lavare immediatamente ed abbondantemente con acqua corrente (e sapone se possibile). Consultare subito un medico. Evitare ulteriori contatti con gli indumenti contaminati.
INGESTIONE: Non indurre il vomito se non espressamente autorizzati dal medico. Non somministrare nulla per via orale se il soggetto è incosciente. Consultare subito un medico.
INALAZIONE: Portare il soggetto all'aria aperta, lontano dal luogo dell'incidente. In caso di sintomi respiratori (tosse, dispnea, respirazione difficoltosa, asma) mantenere l'infortunato in una posizione comoda per la respirazione. Se necessario somministrare ossigeno. Se la respirazione cessa, praticare la respirazione artificiale. Consultare subito un medico.

Protezione dei soccorritori

E' buona norma per il soccorritore che presta aiuto ad un soggetto, che è stato esposto ad una sostanza chimica o ad una miscela, indossare dispositivi di protezione individuale. La natura di tali protezioni dipende dalla pericolosità della sostanza o della miscela, dalla modalità di

SEZIONE 4. Misure di primo soccorso ... / >>

esposizione e dall'entità della contaminazione. In assenza di altre indicazioni più specifiche, si raccomanda di utilizzare guanti monouso in caso di possibile contatto con liquidi biologici. Per la tipologia di DPI adatti per le caratteristiche della sostanza o della miscela, fare riferimento alla sezione 8.

4.2. Principali sintomi ed effetti, sia acuti che ritardati

Informazioni non disponibili

4.3. Indicazione dell'eventuale necessità di consultare immediatamente un medico e di trattamenti speciali

IN CASO DI INGESTIONE: contattare immediatamente un CENTRO ANTIVELENI / un medico / . . .

Mezzi da avere a disposizione sul luogo di lavoro per il trattamento specifico ed immediato

Acqua corrente per il lavaggio cutaneo e oculare.

SEZIONE 5. Misure di lotta antincendio

5.1. Mezzi di estinzione

MEZZI DI ESTINZIONE IDONEI
I mezzi di estinzione sono: anidride carbonica, schiuma, polvere chimica. Per le perdite e gli sversamenti del prodotto che non si sono incendiati, l'acqua nebulizzata può essere utilizzata per disperdere i vapori infiammabili e proteggere le persone impegnate a fermare la perdita.
MEZZI DI ESTINZIONE NON IDONEI
Non usare getti d'acqua. L'acqua non è efficace per estinguere l'incendio tuttavia può essere utilizzata per raffreddare i contenitori chiusi esposti alla fiamma prevenendo scoppi ed esplosioni.

5.2. Pericoli speciali derivanti dalla sostanza o dalla miscela

PERICOLI DOVUTI ALL'ESPOSIZIONE IN CASO DI INCENDIO
Si può creare sovrapressione nei contenitori esposti al fuoco con pericolo di esplosione. Evitare di respirare i prodotti di combustione.

5.3. Raccomandazioni per gli addetti all'estinzione degli incendi

INFORMAZIONI GENERALI
Raffreddare con getti d'acqua i contenitori per evitare la decomposizione del prodotto e lo sviluppo di sostanze potenzialmente pericolose per la salute. Indossare sempre l'equipaggiamento completo di protezione antincendio. Raccogliere le acque di spegnimento che non devono essere scaricate nelle fognature. Smaltire l'acqua contaminata usata per l'estinzione ed il residuo dell'incendio secondo le norme vigenti.
EQUIPAGGIAMENTO
Indumenti normali per la lotta al fuoco, come un autorespiratore ad aria compressa a circuito aperto (EN 137), completo antifiamma (EN469), guanti antifiamma (EN 659) e stivali per Vigili del Fuoco (HO A29 oppure A30).

SEZIONE 6. Misure in caso di rilascio accidentale

6.1. Precauzioni personali, dispositivi di protezione e procedure in caso di emergenza

Bloccare la perdita se non c'è pericolo.
Indossare adeguati dispositivi di protezione (compresi i dispositivi di protezione individuale di cui alla sezione 8 della scheda dati di sicurezza) onde prevenire contaminazioni della pelle, degli occhi e degli indumenti personali. Queste indicazioni sono valide sia per gli addetti alle lavorazioni che per gli interventi in emergenza.

Allontanare le persone non equipaggiate. Utilizzare un'apparecchiatura antideflagrante. Eliminare ogni sorgente di ignizione (sigarette, fiamme, scintille, ecc.) o di calore dall'area in cui si è verificata la perdita.

6.2. Precauzioni ambientali

Impedire che il prodotto penetri nelle fognature, nelle acque superficiali, nelle falde freatiche.

6.3. Metodi e materiali per il contenimento e per la bonifica

Aspirare il prodotto fuoriuscito in recipiente idoneo. Valutare la compatibilità del recipiente da utilizzare con il prodotto, verificando la sezione 10. Assorbire il rimanente con materiale assorbente inerte.
Provvedere ad una sufficiente areazione del luogo interessato dalla perdita. Lo smaltimento del materiale contaminato deve essere effettuato conformemente alle disposizioni del punto 13.

6.4. Riferimento ad altre sezioni

Eventuali informazioni riguardanti la protezione individuale e lo smaltimento sono riportate alle sezioni 8 e 13.

SEZIONE 7. Manipolazione e immagazzinamento

7.1. Precauzioni per la manipolazione sicura

Tenere lontano da calore, scintille e fiamme libere, non fumare né usare fiammiferi o accendini. Senza adeguata ventilazione, i vapori possono accumularsi al suolo ed incendiarsi anche a distanza, se innescati, con pericolo di ritorno di fiamma. Evitare l'accumulo di cariche elettrostatiche. Non mangiare, nè bere, nè fumare durante l'impiego. Togliere gli indumenti contaminati e i dispositivi di protezione prima di accedere alle zone in cui si mangia. Evitare la dispersione del prodotto nell'ambiente.

7.2. Condizioni per lo stoccaggio sicuro, comprese eventuali incompatibilità

Conservare solo nel contenitore originale. Conservare in luogo fresco e ben ventilato, lontano da fonti di calore, fiamme libere, scintille ed altre sorgenti di accensione. Conservare i contenitori lontano da eventuali materiali incompatibili, verificando la sezione 10.

7.3. Usi finali particolari

Informazioni non disponibili

SEZIONE 8. Controlli dell'esposizione/della protezione individuale

8.1. Parametri di controllo

Orange, sweet, ext (orange oil, sweet, terpenes and terpenoids)		
Concentrazione prevista di non effetto sull'ambiente - PNEC		
Valore di riferimento in acqua dolce	0,0054	mg/l
Valore di riferimento in acqua marina	0,00054	mg/l
Valore di riferimento per sedimenti in acqua dolce	1,3	mg/kg
Valore di riferimento per sedimenti in acqua marina	0,13	mg/kg
Valore di riferimento per l'acqua marina, rilascio intermittente	0,00577	mg/l
Valore di riferimento per i microorganismi STP	2,1	mg/l
Valore di riferimento per la catena alimentare (avvelenamento secondario)	13,3	mg/kg
Valore di riferimento per il compartimento terrestre	0,261	mg/kg

Salute - Livello derivato di non effetto - DNEL / DMEL

	Effetti sui consumatori				Effetti sui lavoratori			
Via di Esposizione	Locali acuti	Sistemici acuti	Locali cronici	Sistemici cronici	Locali acuti	Sistemici acuti	Locali cronici	Sistemici cronici
Orale				4,44 mg/kg bw/d				
Inalazione				7,78 mg/m3				31,1 mg/m3
Dermica	92,9 mg/cm2			4,44 mg/kg bw/d	185.8 mg/cm2			

VND = pericolo identificato ma nessun DNEL/PNEC disponibile ; NEA = nessuna esposizione attesa ; NPI = nessun pericolo identificato ; LOW = pericolo basso ; MED = pericolo medio ; HIGH = pericolo alto.

8.2. Controlli dell'esposizione

Considerato che l'utilizzo di misure tecniche adeguate dovrebbe sempre avere la priorità rispetto agli equipaggiamenti di protezione personali, assicurare una buona ventilazione nel luogo di lavoro tramite un'efficace aspirazione locale.
Per la scelta degli equipaggiamenti protettivi personali chiedere eventualmente consiglio ai propri fornitori di sostanze chimiche.
I dispositivi di protezione individuali devono riportare la marcatura CE che attesta la loro conformità alle norme vigenti.
Prevedere doccia di emergenza con vaschetta visoculare.
PROTEZIONE DELLE MANI
Proteggere le mani con guanti da lavoro di categoria III.
Per la scelta definitiva del materiale dei guanti da lavoro (rif. norma EN 374) si devono considerare: compatibilità, degradazione, tempo di permeazione.
Nel caso di preparati la resistenza dei guanti da lavoro agli agenti chimici deve essere verificata prima dell'utilizzo in quanto non prevedibile. I guanti hanno un tempo di usura che dipende dalla durata e dalla modalità d'uso.
PROTEZIONE DELLA PELLE
Indossare abiti da lavoro con maniche lunghe e calzature di sicurezza per uso professionale di categoria II (rif. Regolamento 2016/425 e norma EN ISO 20344). Lavarsi con acqua e sapone dopo aver rimosso gli indumenti protettivi.
Valutare l'opportunità di fornire indumenti antistatici nel caso l'ambiente di lavoro presenti un rischio di esplosività.
PROTEZIONE DEGLI OCCHI
Si consiglia di indossare occhiali protettivi ermetici (rif. norma EN ISO 16321).
PROTEZIONE RESPIRATORIA
L'utilizzo di mezzi di protezione delle vie respiratorie è necessario in caso le misure tecniche adottate non siano sufficienti per limitare

SEZIONE 8. Controlli dell'esposizione/della protezione individuale ... / >>

l'esposizione del lavoratore ai valori di soglia presi in considerazione. Si consiglia di indossare una maschera con filtro di tipo AX la cui classe (1, 2 o 3) dovrà essere scelta in relazione alla concentrazione limite di utilizzo. (rif. norma EN 14387).
Nel caso in cui la sostanza considerata sia inodore o la sua soglia olfattiva sia superiore al relativo TLV-TWA e in caso di emergenza, indossare un autorespiratore ad aria compressa a circuito aperto (rif. norma EN 137) oppure un respiratore a presa d'aria esterna (rif. norma EN 138). Per la corretta scelta del dispositivo di protezione delle vie respiratorie, fare riferimento alla norma EN 529.

CONTROLLI DELL'ESPOSIZIONE AMBIENTALE
Le emissioni da processi produttivi, comprese quelle da apparecchiature di ventilazione dovrebbero essere controllate ai fini del rispetto della normativa di tutela ambientale.
I residui del prodotto non devono essere scaricati senza controllo nelle acque di scarico o nei corsi d'acqua.

SEZIONE 9. Proprietà fisiche e chimiche

9.1. Informazioni sulle proprietà fisiche e chimiche fondamentali

Proprietà		Valore		Informazioni
Stato Fisico		liquido		
Colore		chiaro		
Odore		caratteristico		
Punto di fusione o di congelamento		-74,3	°C	
Punto di ebollizione iniziale	>	35	°C	
Infiammabilità		infiammabile		
Limite inferiore esplosività		0,7		
Limite superiore esplosività		6,1		
Punto di infiammabilità		51	°C	
Temperatura di autoaccensione		255	°C	
Temperatura di decomposizione		non disponibile		
pH		non disponibile		
Viscosità cinematica		<18		
Solubilità		poco e/o non miscibile		
Coefficiente di ripartizione: n-ottanolo/acqua		non disponibile		
Tensione di vapore		2,3	hPa	
Densità e/o Densità relativa		0,842	g/cm3	
Densità di vapore relativa		non disponibile		
Caratteristiche delle particelle		non applicabile		

9.2. Altre informazioni

9.2.1. Informazioni relative alle classi di pericoli fisici

Informazioni non disponibili

9.2.2. Altre caratteristiche di sicurezza

Informazioni non disponibili

SEZIONE 10. Stabilità e reattività

10.1. Reattività

Non vi sono particolari pericoli di reazione con altre sostanze nelle normali condizioni di impiego.

10.2. Stabilità chimica

Il prodotto è stabile nelle normali condizioni di impiego e di stoccaggio.

10.3. Possibilità di reazioni pericolose

I vapori possono formare miscele esplosive con l'aria.

10.4. Condizioni da evitare

Evitare il surriscaldamento. Evitare l'accumulo di cariche elettrostatiche. Evitare qualunque fonte di accensione.

SEZIONE 10. Stabilità e reattività ... / >>

10.5. Materiali incompatibili

Informazioni non disponibili

10.6. Prodotti di decomposizione pericolosi

Per decomposizione termica o in caso di incendio si possono liberare gas e vapori potenzialmente dannosi alla salute.

SEZIONE 11. Informazioni tossicologiche

11.1. Informazioni sulle classi di pericolo definite nel Regolamento (CE) n. 1272/2008

Metabolismo, cinetica, meccanismo di azione e altre informazioni

Informazioni non disponibili

Informazioni sulle vie probabili di esposizione

Informazioni non disponibili

Effetti immediati, ritardati e ed effetti cronici derivanti da esposizioni a breve e lungo termine

Informazioni non disponibili

Effetti interattivi

Informazioni non disponibili

TOSSICITÀ ACUTA

Non risponde ai criteri di classificazione per questa classe di pericolo

CORROSIONE CUTANEA / IRRITAZIONE CUTANEA

Provoca irritazione cutanea

GRAVI DANNI OCULARI / IRRITAZIONE OCULARE

Non risponde ai criteri di classificazione per questa classe di pericolo

SENSIBILIZZAZIONE RESPIRATORIA O CUTANEA

Sensibilizzante per la pelle

MUTAGENICITÀ SULLE CELLULE GERMINALI

Non risponde ai criteri di classificazione per questa classe di pericolo

CANCEROGENICITÀ

Non risponde ai criteri di classificazione per questa classe di pericolo

TOSSICITÀ PER LA RIPRODUZIONE

Non risponde ai criteri di classificazione per questa classe di pericolo

TOSSICITÀ SPECIFICA PER ORGANI BERSAGLIO (STOT) - ESPOSIZIONE SINGOLA

Non risponde ai criteri di classificazione per questa classe di pericolo

TOSSICITÀ SPECIFICA PER ORGANI BERSAGLIO (STOT) - ESPOSIZIONE RIPETUTA

Non risponde ai criteri di classificazione per questa classe di pericolo

PERICOLO IN CASO DI ASPIRAZIONE

Tossico per aspirazione

SEZIONE 11. Informazioni tossicologiche ... / >>

11.2. Informazioni su altri pericoli

In base ai dati disponibili, la sostanza non è elencata nelle principali liste europee di potenziali o sospetti interferenti endocrini con effetti sulla salute umana oggetto di valutazione.

SEZIONE 12. Informazioni ecologiche

Il prodotto è da considerarsi come pericoloso per l'ambiente e presenta tossicità per gli organismi acquatici con effetti negativi a lungo termine per l'ambiente acquatico.

12.1. Tossicità

LC50 - Pesci	5,65 mg/l/96h
EC50 - Crostacei	0,67 mg/l/48h
EC50 - Alghe / Piante Acquatiche	170 mg/l/72h

12.2. Persistenza e degradabilità

Informazioni non disponibili

12.3. Potenziale di bioaccumulo

Informazioni non disponibili

12.4. Mobilità nel suolo

Informazioni non disponibili

12.5. Risultati della valutazione PBT e vPvB

La sostanza non ha proprietà di persistenza, bioaccumulazione e tossicità (PBT) e non è molto persistente e molto bioaccumulabile (vPvB).

12.6. Proprietà di interferenza con il sistema endocrino

In base ai dati disponibili, la sostanza non è elencata nelle principali liste europee di potenziali o sospetti interferenti endocrini con effetti sull'ambiente oggetto di valutazione.

12.7. Altri effetti avversi

Informazioni non disponibili

SEZIONE 13. Considerazioni sullo smaltimento

13.1. Metodi di trattamento dei rifiuti

Riutilizzare, se possibile. I residui del prodotto sono da considerare rifiuti speciali pericolosi. La pericolosità dei rifiuti che contengono in parte questo prodotto deve essere valutata in base alle disposizioni legislative vigenti.
Lo smaltimento deve essere affidato ad una società autorizzata alla gestione dei rifiuti, nel rispetto della normativa nazionale ed eventualmente locale.
Il trasporto dei rifiuti può essere soggetto all'ADR.
La gestione dei rifiuti originati dall'uso o dalla dispersione di questo prodotto deve essere organizzata nel rispetto delle norme relative alla sicurezza sul lavoro. Si veda la sezione 8 per l'eventuale necessità di dotazione di DPI.
IMBALLAGGI CONTAMINATI
Gli imballaggi contaminati devono essere inviati a recupero o smaltimento nel rispetto delle norme nazionali sulla gestione dei rifiuti.

SEZIONE 14. Informazioni sul trasporto

14.1. Numero ONU o numero ID

ADR / RID, IMDG, IATA: ONU 2319

14.2. Designazione ufficiale ONU di trasporto

ADR / RID:	IDROCARBURI TERPENICI, N.A.S.
IMDG:	TERPENE HYDROCARBONS, N.O.S.
IATA:	TERPENE HYDROCARBONS, N.O.S.

SEZIONE 14. Informazioni sul trasporto ... / >>

14.3. Classi di pericolo connesso al trasporto

ADR / RID:	Classe: 3	Etichetta: 3
IMDG:	Classe: 3	Etichetta: 3
IATA:	Classe: 3	Etichetta: 3

14.4. Gruppo d'imballaggio

ADR / RID, IMDG, IATA: III

14.5. Pericoli per l'ambiente

ADR / RID: NO
IMDG: non inquinante marino
IATA: NO

14.6. Precauzioni speciali per gli utilizzatori

ADR / RID:	HIN - Kemler: 30 Disposizione speciale: -	Quantità Limitate: 5 L	Codice di restrizione in galleria: (D/E)
IMDG:	EMS: F-E, S-D	Quantità Limitate: 5 L	
IATA:	Cargo:	Quantità massima: 220 L	Istruzioni Imballo: 366
	Passeggeri:	Quantità massima: 60 L	Istruzioni Imballo: 355
	Disposizione speciale:	-	

14.7. Trasporto marittimo alla rinfusa conformemente agli atti dell'IMO

Informazione non pertinente

SEZIONE 15. Informazioni sulla regolamentazione

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

Categoria Seveso - Direttiva 2012/18/UE: P5c-E2

Restrizioni relative al prodotto o alle sostanze contenute secondo l'Allegato XVII Regolamento (CE) 1907/2006
Prodotto
Punto 3 - 40

Regolamento (UE) 2019/1148 - relativo all'immissione sul mercato e all'uso di precursori di esplosivi
non applicabile

Sostanze in Candidate List (Art. 59 REACH)
In base ai dati disponibili, il prodotto non contiene sostanze SVHC in percentuale ≥ a 0,1%.

Sostanze soggette ad autorizzazione (Allegato XIV REACH)
Nessuna

Sostanze soggette ad obbligo di notifica di esportazione Regolamento (UE) 649/2012:
Nessuna

Sostanze soggette alla Convenzione di Rotterdam:
Nessuna

Sostanze soggette alla Convenzione di Stoccolma:
Nessuna

Controlli Sanitari
I lavoratori esposti a questo agente chimico pericoloso per la salute devono essere sottoposti alla sorveglianza sanitaria effettuata secondo le disposizioni dell'art. 41 del D.Lgs. 81 del 9 aprile 2008 salvo che il rischio per la sicurezza e la salute del lavoratore sia stato valutato

SEZIONE 15. Informazioni sulla regolamentazione ... / >>

irrilevante, secondo quanto previsto dall'art. 224 comma 2.

15.2. Valutazione della sicurezza chimica

Non è stata elaborata / non è ancora disponibile una valutazione di sicurezza chimica per la sostanza.

SEZIONE 16. Altre informazioni

Testo delle indicazioni di pericolo (H) citate alle sezioni 2-3 della scheda:

Flam. Liq. 3	Liquido infiammabile, categoria 3
Asp. Tox. 1	Pericolo in caso di aspirazione, categoria 1
Skin Irrit. 2	Irritazione cutanea, categoria 2
Skin Sens. 1B	Sensibilizzazione cutanea, categoria 1B
Aquatic Chronic 2	Pericoloso per l'ambiente acquatico, tossicità cronica, categoria 2
H226	Liquido e vapori infiammabili.
H304	Può essere letale in caso di ingestione e di penetrazione nelle vie respiratorie.
H315	Provoca irritazione cutanea.
H317	Può provocare una reazione allergica cutanea.
H411	Tossico per gli organismi acquatici con effetti di lunga durata.

LEGENDA:
- ADR: Accordo europeo per il trasporto delle merci pericolose su strada
- ATE / STA: Stima Tossicità Acuta
- CAS: Numero del Chemical Abstract Service
- CE: Numero identificativo in ESIS (archivio europeo delle sostanze esistenti)
- CLP: Regolamento (CE) 1272/2008
- DNEL: Livello derivato senza effetto
- EC50: Concentrazione che dà effetto al 50% della popolazione soggetta a test
- EmS: Emergency Schedule
- GHS: Sistema armonizzato globale per la classificazione e la etichettatura dei prodotti chimici
- IATA DGR: Regolamento per il trasporto di merci pericolose della Associazione internazionale del trasporto aereo
- IC50: Concentrazione di immobilizzazione del 50% della popolazione soggetta a test
- IMDG: Codice marittimo internazionale per il trasporto delle merci pericolose
- IMO: International Maritime Organization
- INDEX: Numero identificativo nell'Allegato VI del CLP
- LC50: Concentrazione letale 50%
- LD50: Dose letale 50%
- OEL: Livello di esposizione occupazionale
- PBT: Persistente, bioaccumulante e tossico
- PEC: Concentrazione ambientale prevedibile
- PEL: Livello prevedibile di esposizione
- PMT: Persistente, mobile e tossico
- PNEC: Concentrazione prevedibile priva di effetti
- REACH: Regolamento (CE) 1907/2006
- RID: Regolamento per il trasporto internazionale di merci pericolose su treno
- TLV: Valore limite di soglia
- TLV CEILING: Concentrazione che non deve essere superata durante qualsiasi momento dell'esposizione lavorativa.
- TWA: Limite di esposizione medio pesato
- TWA STEL: Limite di esposizione a breve termine
- VOC: Composto organico volatile
- vPvB: Molto persistente e molto bioaccumulabile
- vPvM: Molto persistente e molto mobile
- WGK: Classe di pericolosità acquatica (Germania).

BIBLIOGRAFIA GENERALE:
1. Regolamento (CE) 1907/2006 del Parlamento Europeo (REACH)
2. Regolamento (CE) 1272/2008 del Parlamento Europeo (CLP)
3. Regolamento (UE) 2020/878 (All. II Regolamento REACH)
4. Regolamento (CE) 790/2009 del Parlamento Europeo (I Atp. CLP)
5. Regolamento (UE) 286/2011 del Parlamento Europeo (II Atp. CLP)
6. Regolamento (UE) 618/2012 del Parlamento Europeo (III Atp. CLP)
7. Regolamento (UE) 487/2013 del Parlamento Europeo (IV Atp. CLP)
8. Regolamento (UE) 944/2013 del Parlamento Europeo (V Atp. CLP)
9. Regolamento (UE) 605/2014 del Parlamento Europeo (VI Atp. CLP)
10. Regolamento (UE) 2015/1221 del Parlamento Europeo (VII Atp. CLP)
11. Regolamento (UE) 2016/918 del Parlamento Europeo (VIII Atp. CLP)
12. Regolamento (UE) 2016/1179 (IX Atp. CLP)

SEZIONE 16. Altre informazioni ... / >>

13. Regolamento (UE) 2017/776 (X Atp. CLP)
14. Regolamento (UE) 2018/669 (XI Atp. CLP)
15. Regolamento (UE) 2019/521 (XII Atp. CLP)
16. Regolamento delegato (UE) 2018/1480 (XIII Atp. CLP)
17. Regolamento (UE) 2019/1148
18. Regolamento delegato (UE) 2020/217 (XIV Atp. CLP)
19. Regolamento delegato (UE) 2020/1182 (XV Atp. CLP)
20. Regolamento delegato (UE) 2021/643 (XVI Atp. CLP)
21. Regolamento delegato (UE) 2021/849 (XVII Atp. CLP)
22. Regolamento delegato (UE) 2022/692 (XVIII Atp. CLP)
23. Regolamento delegato (UE) 2023/707
24. Regolamento delegato (UE) 2023/1434 (XIX Atp. CLP)
25. Regolamento delegato (UE) 2023/1435 (XX Atp. CLP)
26. Regolamento delegato (UE) 2024/197 (XXI Atp. CLP)
27. Regolamento delegato (UE) 2024/2564 (XXII Atp. CLP)
28. Regolamento (UE) 2024/2865

- The Merck Index. - 10th Edition
- Handling Chemical Safety
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- Sito Web IFA GESTIS
- Sito Web Agenzia ECHA
- Banca dati di modelli di SDS di sostanze chimiche - Ministero della Salute e Istituto Superiore di Sanità

Nota per l'utilizzatore:
Le informazioni contenute in questa scheda si basano sulle conoscenze disponibili presso di noi alla data dell'ultima versione. L'utilizzatore deve assicurarsi della idoneità e completezza delle informazioni in relazione allo specifico uso del prodotto.
Non si deve interpretare tale documento come garanzia di alcuna proprietà specifica del prodotto.
Poichè l'uso del prodotto non cade sotto il nostro diretto controllo, è obbligo dell'utilizzatore osservare sotto la propria responsabilità le leggi e le disposizioni vigenti in materia di igiene e sicurezza. Non si assumono responsabilità per usi impropri.
Fornire adeguata formazione al personale addetto all'utilizzo di prodotti chimici.

METODI DI CALCOLO DELLA CLASSIFICAZIONE
Pericoli chimico fisici: La classificazione del prodotto è stata derivata dai criteri stabiliti dal Regolamento CLP Allegato I Parte 2. I metodi di valutazione delle proprietà chimico fisiche sono riportati in sezione 9.
Pericoli per la salute: La classificazione del prodotto è basata sui metodi di calcolo di cui all'Allegato I del CLP Parte 3, salvo che sia diversamente indicato in sezione 11.
Pericoli per l'ambiente: La classificazione del prodotto è basata sui metodi di calcolo di cui all'Allegato I del CLP Parte 4, salvo che sia diversamente indicato in sezione 12.

Modifiche rispetto alla revisione precedente
Sono state apportate variazioni alle seguenti sezioni:
01.

EXPOSURE SCENARIO FOR COMMUNICATION

Substance Name: Orange, Citrus sinensis, ext.
EC Number: 232-433-8
CAS Number: 8028-48-6
Registration Number: 01-2119493353-35-0000
Date of Generation/Revision: 10/05/2019
Author: HaskoningDHV Nederland B.V.

Table of Contents

Reader guide to the appendix

The appendix to the exposure scenario describes how this substance can be extracted from the fruit/plant material, processed and used in an industrial, professional or consumer setting.

The table of contents will help you to find your particular type of use of the substance. The name of each exposure scenario describes both the covered activity and information on the type of facility and type of product covered. You only need to concern yourself with the scenarios describing uses applicable to your own use and those of your users.

In the sections relating to each exposure scenario, you will find which uses (contributing scenarios) are covered and what operational conditions and risk management measures are needed to use the substance safely. Each exposure scenario is built up as follows:

Section x.1: Title of the exposure scenario. Provides the relevant Environmental Release Categories (ERCs), Process Categories (PROCs) and/or Product Categories (PC) for contributing scenarios, together with a description of the activities covered.

Section x.2: Conditions of use affecting exposure. Provides an overview of the operational conditions and risk management measures used for the risk characterization for each of the contributing scenarios covered.

For the environmental assessment the following information is present:

- Maximum amount per site (both daily and yearly)
- Maximum number of emission days
- Minimum flow of a river onto which the STP discharges its effluent
- Information regarding the treatment of waste water (including the minimum STP discharge rate)

For the worker exposure the following information is present:

- % of substance in any mixtures used
- The form of the mixture in which the substance is used

Most items listed in the subsection “Other operational conditions” are a refined description of the process category covered. Please note that if a use differs from the description, it should be verified using the information in section 4 if the use is actually covered. The following information can be found here (among others):

- Maximum duration of use per shift
- Indoor or outdoor use
- Assumed process temperature

In the subsection “Technical and operational conditions and measures” an overview of the risk management measures that need to be in place is given.

Section x.3: Exposure estimation and reference to its source. This section contains information on the exposure estimation methods, the calculated exposure values and risk characterization ratios (RCR). This section can be used in the generation of a mixture (extended) Safety Data Sheet, when scaling is used to determine if a use is covered, or when a downstream user performs his own Chemical Safety Assessment. When making a downstream user assessment or when applying scaling, the RCR listed in Section 3 may not be exceeded.

Section x.4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES. This section provides guidance to the downstream user to determine if he works within the boundaries set in the exposure scenario. It provides information which can be used in scaling operations, e.g. the assumed effectiveness of risk management measures.

Good practices applicable to all worker ES

The following operational, organizational and risk management measures are applicable for all of the worker uses of the substance. They were determined based upon a hazard for which a no effect level could not be derived, based upon the current knowledge. Therefore the impact of these measures has not been quantified.

Generic organisational measures (to be applied for all uses)

- Minimise number of staff exposed;
- Minimisation of manual phases;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed;
- Training for staff on good practice;
- Good standard of personal hygiene.

Generic personal protective equipment (PPE; to be applied for all uses)

PPE for sensitizers (98% effective dermal)
- Substance/task appropriate gloves [PPE18];
- Skin coverage with appropriate barrier material based on potential for contact with the chemicals;
- Substance/task appropriate respirator;
- Optional face shield;
- Eye protection.

1. ES 1: Manufacture

1.1. Title section

ES name: *Manufacture of Orange oil*

Environment	
1: *ENV1a Extraction of fruits/plant material and processing of oil/water emulsion*	ERC 1
2: *ENV1b Extraction of fruits/plant material and processing of oil/water emulsion*	ERC 1
3: *ENV2 Further refinement of essential oils*	ERC 1
Worker	
4: *Manufacture in closed process, no likelihood of exposure*	PROC 1
5: *ES1 Separation of peels and watery liquids (juice): Peeling, pressing, rasping of peels*	PROC 3
6: *ES1a Cleaning task within the separation of peels and watery liquids (juice): Peeling, pressing, rasping of peels*	PROC 4
7: *ES2 Processing emulsion of waters/oils/peels. Clarification, dewaxing(cold), filtering, centrifuging, distillation*	PROC 3
8: *ES2a Cleaning task within the processing of emulsion of waters/oils/peels. Clarification, dewaxing(cold), filtering, centrifuging, distillation*	PROC 4
9: *ES3 Temporary storage or stocking*	PROC 2
10: *ES4 Filling of tanks, drums and other containers. Labeling. Discharging of drums (pump, hose, pouring)*	PROC 8b
11: *ES4a Cleaning task within the filling of tanks, drums and other containers. Discharging of drums (pump, hose, pouring)*	PROC 4
12: *ES5-1 Refining essential oils using sophisticated vacuum distillation*	PROC 3
13: *ES5-2 Further refinement of essential oils*	PROC 3
14: *ES5a-1 Cleaning task within the refining essential oils using sophisticated vacuum distillation*	PROC 4
15: *ES5a-2 Cleaning task within the further refining of essential oils*	PROC 4
16: *Use as laboratory reagent*	PROC 15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: ENV1a Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 17.5 tonnes/day
• Annual use at a site: <= 3.5E3 tonnes/year
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 200 days/year
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: *Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.*
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

1.2.2. Control of environmental exposure: ENV1b Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.633 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 126.5 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 200 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 200 days/year
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: *Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.*
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

1.2.3. Control of environmental exposure: ENV2 Further refinement of essential oils (ERC 1)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.632 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 230.9 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 365 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 365 days/year
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: *Waste is incinerated onsite. When incinerated onsite full decomposition is expected and thus releases are negligible.*
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

1.2.4. Control of worker exposure

<u>Conditions of use applicable to all contributing scenarios</u>

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	*Specific conditions of use*
Manufacture in closed process, no likelihood of exposure (PROC 1)	*Use in closed process, no likelihood of exposure*
ES1 Separation of peels and watery liquids (juice): Peeling, pressing, rasping of peels (PROC 3)	*Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.*
ES1a Cleaning task within the separation of peels and watery liquids (juice): Peeling, pressing, rasping of peels (PROC 4)	*Limit the substance in product to 10 %.* *Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *General ventilation giving at least 3 ACH*
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour
	Transfer of liquid product with flow of: 100 - 1000 l/minute *Handling that reduces contact between product and adjacent air* *Splash loading*
ES2 Processing emulsion of waters/oils/peels. Clarification, dewaxing(cold), filtering, centrifuging, distillation (PROC 3)	*Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.*
ES2a Cleaning task within the processing of emulsion of waters/oils/peels. Clarification, dewaxing(cold), filtering, centrifuging, distillation (PROC 4)	*Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *Ensure medium level containment* *General ventilation giving at least 3 ACH*
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air* *Submerged loading*
ES3 Temporary storage or stocking (PROC 2)	*Use in closed, continuous process with occasional controlled exposure* *Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.*
ES4 Filling of tanks, drums and other containers. Labeling. Discharging of drums (pump, hose, pouring) (PROC 8b)	*Ensure fixed capturing hood is used.* *Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *General ventilation giving at least 3 ACH*
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

	Submerged loading *Transfer of liquid product with flow of more than 1000 l/minute* *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
ES4a Cleaning task within the filling of tanks, drums and other containers. Discharging of drums (pump, hose, pouring) (PROC 4)	*Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *General ventilation giving at least 3 ACH* *Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.*
	Submerged loading *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
ES5-1 Refining essential oils using sophisticated vacuum distillation (PROC 3)	*Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.*
ES5-2 Further refinement of essential oils (PROC 3)	*Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.*
ES5a-1 Cleaning task within the refining essential oils using sophisticated vacuum distillation (PROC 4)	*Containment — no extraction - Medium level containment.* *Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *General ventilation giving at least 3 ACH*
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air* *Submerged loading*
ES5a-2 Cleaning task within the further refining of essential oils (PROC 4)	*Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *Ensure low level containment* *General ventilation giving at least 3 ACH*
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air* *Submerged loading*
Use as laboratory reagent (PROC 15)	*Handle in an enclosing hood with exhaust ventilation.* *Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure* *Ensure low level containment* *General ventilation giving at least 3 ACH*

	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Activities with relatively undisturbed open surface of >3 m² *Activities with agitated surface* *Surface < 0.1 m²*
	Transfer of liquid product with flow of less than 0.1 l/minute *Transfer of liquid product with flow of: 0.1 - 1 l/minute* *Handling that reduces contact between product and adjacent air* *Splash loading*

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: ENV1a Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1)

Release	Release factor estimation method	Explanation / Justification
Water	Release factor (Site-specific information)	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day
Air	Release factor (Site-specific information)	**Initial release factor:** 1.2% **Final release factor:** 1.2% **Local release rate:** 210 kg/day
Soil	ERC based	**Final release factor:** 0.01%

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.003 mg/kg dw	RCR = 0.011
Man via environment - Inhalation	**Local PEC:** 0.032 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

1.3.2. Environmental release and exposure: ENV1b Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1)

Release	Release factor estimation method	Explanation / Justification
Water	Release factor (Site-specific information)	**Initial release factor:** 0.2% **Final release factor:** 0.2% **Local release rate:** 1.265 kg/day
Air	Release factor (Site-specific information)	**Initial release factor:** 1.2% **Final release factor:** 1.2% **Local release rate:** 7.59 kg/day

Release	Release factor estimation method	Explanation / Justification
Soil	ERC based	**Final release factor:** 0.01%

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.397E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.001 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

1.3.3. Environmental release and exposure: ENV2 Further refinement of essential oils (ERC 1)

Release	Release factor estimation method	Explanation / Justification
Water	Release factor (Site-specific information)	**Initial release factor:** 0.2% **Final release factor:** 0.2% **Local release rate:** 1.265 kg/day
Air	Release factor (Site-specific information)	**Initial release factor:** 1.2% **Final release factor:** 1.2% **Local release rate:** 7.589 kg/day
Soil	ERC based	**Final release factor:** 0.01%

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.396E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.002 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.006 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

1.3.4. Worker exposure: Manufacture in closed process, no likelihood of exposure (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.057 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.5. Worker exposure: ES1 Separation of peels and watery liquids (juice): Peeling, pressing, rasping of peels (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

1.3.6. Worker exposure: ES1a Cleaning task within the separation of peels and watery liquids (juice): Peeling, pressing, rasping of peels (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.2 mg/m³ (ART 1.5)	0.296
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.334

1.3.7. Worker exposure: ES2 Processing emulsion of waters/oils/peels. Clarification, dewaxing(cold), filtering, centrifuging, distillation (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

1.3.8. Worker exposure: ES2a Cleaning task within the processing of emulsion of waters/oils/peels. Clarification, dewaxing(cold), filtering, centrifuging, distillation (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	10 mg/m³ (ART 1.5)	0.322
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.36

1.3.9. Worker exposure: ES3 Temporary storage or stocking (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

1.3.10. Worker exposure: ES4 Filling of tanks, drums and other containers. Labeling. Discharging of drums (pump, hose, pouring) (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2 mg/m³ (ART 1.5)	0.135
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.212

1.3.11. Worker exposure: ES4a Cleaning task within the filling of tanks, drums and other containers. Discharging of drums (pump, hose, pouring) (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.617

1.3.12. Worker exposure: ES5-1 Refining essential oils using sophisticated vacuum distillation (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

1.3.13. Worker exposure: ES5-2 Further refinement of essential oils (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

1.3.14. Worker exposure: ES5a-1 Cleaning task within the refining essential oils using sophisticated vacuum distillation (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	10 mg/m³ (ART 1.5)	0.322
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.36

1.3.15. Worker exposure: ES5a-2 Cleaning task within the further refining of essential oils (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	19 mg/m³ (ART 1.5)	0.611
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.65

1.3.16. Worker exposure: Use as laboratory reagent (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.8 mg/m³ (ART 1.5)	0.122
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.124

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

2. ES 2: Formulation or re-packing

2.1. Title section

ES name: *Generic formulation*

Environment	
1: *Blending of mixtures and distribution*	ERC 2
Worker	
2: *Formulation and distribution / compounding in closed system, no likelihood of exposure*	PROC 1
3: *Formulation and distribution / compounding in closed, continuous process with occasional controlled exposure*	PROC 2
4: *Formulation and distribution / compounding in closed batch process (synthesis or formulation)*	PROC 3
5: *Formulation and distribution / compounding in batch and other process (synthesis) where opportunity for exposure arises*	PROC 4
6: *Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)*	PROC 5
7: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities*	PROC 8a
8: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
9: *Transfer of substance or preparation into small containers (dedicated filling line, including weighing)*	PROC 9
10: *Use as laboratory reagent*	PROC 15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: *Blending of mixtures and distribution* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.063 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 6.326 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 100 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

2.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	**Specific conditions of use**
Formulation and distribution / compounding in closed system, no likelihood of exposure **(PROC 1)**	Covers concentrations up to 100 % Use in closed process, no likelihood of exposure
Formulation and distribution / compounding in closed, continuous process with occasional controlled exposure **(PROC 2)**	Covers concentrations up to 100 % Use in closed, continuous process with occasional controlled exposure Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Formulation and distribution / compounding in closed batch process (synthesis or formulation) **(PROC 3)**	Covers concentrations up to 100 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Formulation and distribution / compounding in batch and other process (synthesis) where opportunity for exposure arises **(PROC 4)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Surface 1 - 3 m² *Activities with agitated surfaces*
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **(PROC 5)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Surface 1 - 3 m²

	Activities with agitated surface
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **(PROC 8a)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Submerged loading *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities **(PROC 8b)**	Covers concentrations up to 100 % Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Submerged loading *Transfer of liquid product with flow of more than 1000 l/minute* *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **(PROC 9)**	Covers concentrations up to 25 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use as laboratory reagent **(PROC 15)**	Covers concentrations up to 100 % Handle in an enclosing hood with exhaust ventilation. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Activities with relatively undisturbed open surface of >3 m² *Activities with agitated surface* *Surface < 0.1 m²*
	Transfer of liquid product with flow of: 0.1 - 1 l/minute *Transfer of liquid product with flow of less than 0.1 l/minute* *Handling that reduces contact between product and adjacent air* Splash loading

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Blending of mixtures and distribution (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	ERC based	**Initial release factor:** 2% **Final release factor:** 2% **Local release rate:** 1.266 kg/day
Air	ERC based	**Initial release factor:** 2.5% **Final release factor:** 2.5% **Local release rate:** 1.582 kg/day
Soil	ERC based	**Final release factor:** 0.01%

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.856E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.003 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

2.3.2. Worker exposure: Formulation and distribution / compounding in closed system, no likelihood of exposure (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.057 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.3. Worker exposure: Formulation and distribution / compounding in closed, continuous process with occasional controlled exposure (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

2.3.4. Worker exposure: Formulation and distribution / compounding in closed batch process (synthesis or formulation) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

2.3.5. Worker exposure: Formulation and distribution / compounding in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.232

2.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.27

2.3.7. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.656

2.3.8. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2 mg/m³ (ART 1.5)	0.135
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.212

2.3.9. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.206 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.577

2.3.10. Worker exposure: Use as laboratory reagent (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.8 mg/m³ (ART 1.5)	0.122
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.124

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.

- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

3. ES 3: Formulation or re-packing; Perfumes, Fragrances (PC 28)

3.1. Title section

ES name: *GES1 - Formulation of fragrance compounds*
Product category: PC 3: Air care products; PC 8: Biocidal Products; PC 28: Perfumes, Fragrances; PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 39: Cosmetics, personal care products

Environment	
1: *Formulation of fragrance compounds at large/medium sites*	ERC 2
2: *Formulation of fragrance compounds at small sites*	ERC 2
Worker	
3: *Material transfers from/to vessel/container at dedicated facility (IFRA F-1)*	PROC 8b
4: *Storage (IFRA F-2)*	PROC 1
5: *Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3)*	PROC 3
6: *Mixing operations (open systems) in batch process including filling of equipment and sample collection (IFRA F-4)*	PROC 5
7: *QC laboratory (IFRA F-5)*	PROC 15
8: *Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6)*	PROC 9
9: *Equipment cleaning and maintenance (IFRA F-7)*	PROC 8a

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: *Formulation of fragrance compounds at large/medium sites* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.632 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 158 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 250 days/year *Equivalent to number of working days, based on 2002/2003 data and 2008 inquiry to compounders*
Technical and organisational conditions and measures
• Operational Conditions for IFRA SpERCs: Operational Conditions for IFRA SpERCs applicable (IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) *- Compounding is carried out as a batch-wise process;* *- After each batch a number of mixing vessels will need to be cleaned;* *- The delivery area is a contained area so spills and contaminated rain is drained to the water treatment system;* *- Generally the empty containers are not cleaned but they are either dedicated containers or they are recycled by an external company;* *- Pumps may be cleaned with water and the water is discharged into the drains. Some minor losses may occur there. Estimated losses range from <<0.01% to 0.08%;* *- Mixing vessels and batch sizes span a large volume range, from a few litres to many cubic meters;* *- The main release occurs after the mixing process when containers, pumps and other equipment are cleaned with water, detergent and sometimes steam or alcohol. The average releases range from 0.015 to 0.1%, with higher estimates for small batches (< 60L) up to 0.3%. These results are based on measurements;*

- During the filling of all finished products, rinsing or cleaning procedures are directed towards avoiding emissions to wastewater. Estimated emissions are in the range of 0.01%; *- Floors are mopped and the water is discharged to the sewer system; spills are absorbed and treated as chemical waste, although small spills may be washed down the drain.)*
• Operational Conditions for SpERC IFRA 2.1a.v1: Specific Operational Conditions for IFRA 2.1a.v1 are applied (IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) *- The number and sizes of batches is variable (surveyed sites reported from 13 up to 140 batches per day). Naturally, small number of batches is produced in larger quantities;* *- Dosing is a mixture of automatic and manual dosing.)*
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: *Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.*
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

3.2.2. Control of environmental exposure: *Formulation of fragrance compounds at small sites* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.253 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 63.25 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 250 days/year *Equivalent to number of working days, based on 2002/2003 data and 2008 inquiry to compounders*
Technical and organisational conditions and measures
• Operational Conditions for IFRA SpERCs: Operational Conditions for IFRA SpERCs applicable (IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) *- Compounding is carried out as a batch-wise process;* *- After each batch a number of mixing vessels will need to be cleaned;* *- The delivery area is a contained area so spills and contaminated rain is drained to the water treatment system;* *- Generally the empty containers are not cleaned but they are either dedicated containers or they are recycled by an external company;* *- Pumps may be cleaned with water and the water is discharged into the drains. Some minor losses may occur there. Estimated losses range from <<0.01% to 0.08%;* *- Mixing vessels and batch sizes span a large volume range, from a few litres to many cubic meters;* *- The main release occurs after the mixing process when containers, pumps and other equipment are cleaned with water, detergent and sometimes steam or alcohol. The average releases range from 0.015 to 0.1%, with higher estimates for small batches (< 60L) up to 0.3%. These results are based on measurements;* *- During the filling of all finished products, rinsing or cleaning procedures are directed towards avoiding emissions to wastewater. Estimated emissions are in the range of 0.01%;* *- Floors are mopped and the water is discharged to the sewer system; spills are absorbed and treated as chemical waste, although small spills may be washed down the drain.*
• Operational Conditions for SpERC IFRA 2.1b.v1: Specific Operational Conditions for IFRA 2.1b.v1 are applied (IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) *- The number and sizes of batches is variable (surveyed sites reported from <1 up to 15 batches per day). Naturally, small number of batches is produced in larger quantities;*

- Dosing is mainly a manual process.
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: *Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.*
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

3.2.3. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Material transfers from/to vessel/container at dedicated facility (IFRA F-1) **(PROC 8b)**	Covers concentrations up to 100 % Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH*
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Submerged loading *Transfer of liquid product with flow of more than 1000 l/minute* *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
Storage (IFRA F-2) **(PROC 1)**	Covers concentrations up to 100 % Use in closed process, no likelihood of exposure
Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3) **(PROC 3)**	Covers concentrations up to 100 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Mixing operations (open systems) in batch process including filling of equipment	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure

and sample collection (IFRA F-4) **(PROC 5)**	*Ensure medium level containment* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Surface 1 - 3 m² *Activities with agitated surface*
QC laboratory (IFRA F-5) **(PROC 15)**	Covers concentrations up to 100 % Handle in an enclosing hood with exhaust ventilation. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Activities with relatively undisturbed open surface of more than 3 m² *Activities with agitated surface* *Surface < 0.1 m²*
	Transfer of liquid product with flow of: 0.1 - 1 l/minute *Transfer of liquid product with flow of less than 0.1 l/minute* *Handling that reduces contact between product and adjacent air* Splash loading
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6) **(PROC 9)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Splash loading *Transfer of liquid product with flow of: 1 - 10 l/minute* *Handling that reduces contact between product and adjacent air*
Equipment cleaning and maintenance (IFRA F-7) **(PROC 8a)**	Covers concentrations up to 25 % *Limit the substance in product to 50 %.* Limit the substance in product to 10 %. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
	Activities with treated/contaminated objects (surface 1 - 3 m²) *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* *Contamination 10-90 % of surface*
	Transfer of liquid product with flow of: 100 - 1000 l/minute *Handling that reduces contact between product and adjacent air* Splash loading

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: *Formulation of fragrance compounds at large/medium sites* (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based IFRA - IFRA 2.1a.v1 IFRA - Formulation of fragrance compounds - IFRA - Formulation of fragrance compounds at large/medium sites	**Initial release factor:** 0.2% **Final release factor:** 0.2% **Local release rate:** 1.264 kg/day **Explanation / Justification:** A survey was conducted in 2008 to obtain information on the emission to water during the compounding process . Responses to the questionnaire were received from 7 compounding sites with varying size and varying degree of emission control. Most responses showed that the COD in wastewater was caused mainly by the presence of fragrances in the water. Based on indications of the COD and the production volumes, and assuming that the COD of most of the fragrance ingredients in wastewater = 3 mg O/mg substance it was possible to estimate the release of products to wastewater. This fraction, prior to any treatment, ranges from 0.2 to < 0.43 % for the small compounders whereas for the large compounders the estimates range from 0.01 to 0.15%.
Air	SpERC based same as above	**Initial release factor:** 2.5% **Final release factor:** 2.5% **Local release rate:** 15.8 kg/day **Explanation / Justification:** Default conservative value from ERC2 Not enough specific data have been collected to derive a specific release factor for compounding sites, even though it is obvious that the default release factor of 2.5% overestimates the emission to air. Indeed, most fragrance substances present a moderate to low volatility, most of substances VP being < 500 Pa while the default release factor of 2.5% is based on highly volatile substances (>1000 Pa).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** All solid waste is collected. Used packaging which has been in contact with chemicals are recycled, collected by waste companies or incinerated. The delivery area as well as the mixing halls is in contained area, so all water is collected in dedicated sewers. This implies that there is no direct emission to the soil. Spills are cleaned with specific sorbing materials or cleaned with water that is collected in dedicated sewers along with the process water. Spilled fragrances may be collected and recycled in the process.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.395E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.003 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005	RCR < 0.005

Protection target	Exposure concentration	Risk characterisation
	mg/kg bw/day	
Man via environment - combined routes		RCR < 0.005

3.3.2. Environmental release and exposure: *Formulation of fragrance compounds at small sites* (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based IFRA - IFRA 2.1b.v1 IFRA - Formulation of fragrance compounds - IFRA - Formulation of fragrance compounds at small sites	**Initial release factor:** 0.5% **Final release factor:** 0.5% **Local release rate:** 1.265 kg/day **Explanation / Justification:** A survey was conducted in 2008 to obtain information on the emission to water during the compounding process . Responses to the questionnaire were received from 7 compounding sites with varying size and varying degree of emission control. Most responses showed that the COD in wastewater was caused mainly by the presence of fragrances in the water. Based on indications of the COD and the production volumes, and assuming that the COD of most of the fragrance ingredients in wastewater = 3 mg O/mg substance it was possible to estimate the release of products to wastewater. This fraction, prior to any treatment, ranges from 0.2 to < 0.43 % for the small compounders whereas for the large compounders the estimates range from 0.01 to 0.15%.
Air	SpERC based same as above	**Initial release factor:** 2.5% **Final release factor:** 2.5% **Local release rate:** 6.325 kg/day **Explanation / Justification:** Default conservative value from ERC2 Not enough specific data have been collected to derive a specific release factor for compounding sites, even though it is obvious that the default release factor of 2.5% overestimates the emission to air. Indeed, most fragrance substances present a moderate to low volatility, most of substances VP being < 500 Pa while the default release factor of 2.5% is based on highly volatile substances (>1000 Pa).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** All solid waste is collected. Used packaging which has been in contact with chemicals are recycled, collected by waste companies or incinerated. The delivery area as well as the mixing halls is in contained area, so all water is collected in dedicated sewers. This implies that there is no direct emission to the soil. Spills are cleaned with specific sorbing materials or cleaned with water that is collected in dedicated sewers along with the process water. Spilled fragrances may be collected and recycled in the process.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.397E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1

Protection target	Exposure concentration	Risk characterisation
Man via environment - Inhalation	**Local PEC:** 0.001 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

3.3.3. Worker exposure: ***Material transfers from/to vessel/container at dedicated facility (IFRA F-1)*** **(PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2 mg/m³ (ART 1.5)	0.135
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.212

3.3.4. Worker exposure: ***Storage (IFRA F-2)*** **(PROC 1)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.057 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.5. Worker exposure: ***Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3)*** **(PROC 3)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

3.3.6. Worker exposure: ***Mixing operations (open systems) in batch process including filling of equipment and sample collection (IFRA F-4)*** **(PROC 5)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.27

3.3.7. Worker exposure: ***QC laboratory (IFRA F-5)*** **(PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.8 mg/m³ (ART 1.5)	0.122
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.124

3.3.8. Worker exposure: ***Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6)*** **(PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.4 mg/m³ (ART 1.5)	0.174
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.212

3.3.9. Worker exposure: ***Equipment cleaning and maintenance (IFRA F-7)*** **(PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.411 mg/kg bw/day (TRA Workers 3.0)	0.046
Combined, systemic, long term		0.496

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

4. ES 4: Formulation or re-packing; Perfumes, Fragrances (PC 28)

4.1. Title section

ES name: *GES2 - Formulation of fragranced end-products*
Product category: PC 3: Air care products; PC 8: Biocidal Products ; PC 28: Perfumes, Fragrances; PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 39: Cosmetics, personal care products

Environment	
1: *IFRA SG-1: AISE Granular & Low Viscosity Liquids - large scale*	ERC 2
2: *IFRA SG-2: AISE Granular & Low Viscosity Liquids - medium scale*	ERC 2
3: *IFRA SG-3: AISE Granular & Low Viscosity Liquids - small scale*	ERC 2
4: *IFRA SG-4: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - large scale*	ERC 2
5: *IFRA SG-5: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - medium scale*	ERC 2
6: *IFRA SG-6: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - small scale*	ERC 2
7: *IFRA SG-7: AISE & CE Fine Fragrances (cleaning with solvent) - all scales*	ERC 2
8: *IFRA SG-8: ERC2 default - all scales*	ERC 2
Worker	
9: *Material transfers from/to vessel/container at dedicated facility (AISE M-6)*	PROC 8b
10: *QC laboratory (AISE M-9)*	PROC 15
11: *Storage (AISE M-1)*	PROC 1
12: *Mixing operations (closed systems) in batch process including filling of equipment and sample collection (AISE M-3)*	PROC 3
13: *Mixing operations (open systems) in batch process including filling of equipment and sample collection (AISE M-5)*	PROC 5
14: *Equipment cleaning and maintenance*	PROC 8a
15: *Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (AISE M-7)*	PROC 9
16: *Production of preparations or articles by tabletting, compression, extrusion or pelletisation (AISE M-8)*	PROC 14

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: *IFRA SG-1: AISE Granular & Low Viscosity Liquids - large scale* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 12.66 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 3.165E3 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Granular detergents are obtained by drying liquid slurries.

Applicable for granular cleaning and maintenance products (SpERC 2.1.a.v2)
• Type of process: Substance applied in aqueous process solution with negligible volatilization *Applicable for liquid cleaning and maintenance products (SpERCs 2.1.g.v2)*
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Residues of granular detergents recovered in cleaning steps at packaging or transfer lines are recycled into the slurries. *Applicable for granular cleaning and maintenance products (SpERC 2.1.a.v2)*
• Equipment cleaning: Equipment cleaning with minimized emissions to wastewater (Typically implemented measures for reducing emissions to waste water may include: - Dry cleaning of equipment (Use of absorbent materials and vacuum cleaning including incineration of resulting solid waste) - Cleaning involving so-called pigs - Cleaning involving so-called ""cleaning in place"" (CIP System) - Steam cleaning and/or - Manual removal of residual products adhering to equipment (e.g. by manual scrubbing, vacuum cleaning, etc.) - use of two-liner systems (i.e. single use disposable reactor cover that is incinerated after use as solid waste)) *Applicable for liquid cleaning and maintenance products (SpERCs 2.1.g.v2)*
• Process efficiency: Process optimized for highly efficient use of raw materials (II) (Typical measures may include e.g. - Closed automated process and/or - Closed transfer system and/or - Centralized process control and/or - re-use of process grey water for cleaning - optimized and/or automated systems for the transport and handling of raw materials, that minimize overall exposure levels and incidental spills - Reduced number of transfer and cleaning operations through e.g. - Manufacturing of different products from one premix (masterbatch), to which certain ingredients are added to yield the final products. - Dedicated storage tanks for raw materials, premixes and final products Recovery of materials through e.g. - Recycling Residues of granular detergents in cleaning steps at packaging or transfer lines into the slurries.)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Waste treatment: Residues which cannot be recycled are disposed of as chemical waste *Applicable for granular cleaning and maintenance products (SpERC 2.1.a.v2)*
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse

4.2.2. Control of environmental exposure: *IFRA SG-2: AISE Granular & Low Viscosity Liquids - medium scale* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 1.266 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 316.5 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Granular detergents are obtained by drying liquid slurries. *Applicable for granular cleaning and maintenance products (SpERC 2.1.b.v2)*
• Type of process: Substance applied in aqueous process solution with negligible volatilization

Applicable for liquid cleaning and maintenance products (SpERCs 2.1.h.v2)
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Residues of granular detergents recovered in cleaning steps at packaging or transfer lines are recycled into the slurries. *Applicable for granular cleaning and maintenance products (SpERC 2.1.b.v2)*
• Equipment cleaning: Equipment cleaning with reduced emissions to wastewater (Typically implemented measures for reducing emissions to waste water may include: - Manual removal of residual products adhering to equipment (e.g. by manual scrubbing, vacuum cleaning, etc.) - use of two-liner systems (i.e. single use disposable reactor cover that is incinerated after use as solid waste)) *Applicable for liquid cleaning and maintenance products (SpERCs 2.1.h.v2)*
• Process efficiency: Process optimized for efficient use of raw materials. (Typical measures may include e.g. - Closed batch systems and / or - Semi-closed transfer system and/or - Batch production of final product Reduced number of transfer and cleaning operations through e.g. - Dedicated storage tanks for raw materials, premixes and final products)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Waste treatment: Residues which cannot be recycled are disposed of as chemical waste *Applicable for granular cleaning and maintenance products (SpERC 2.1.b.v2)*
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse

4.2.3. Control of environmental exposure: *IFRA SG-3: AISE Granular & Low Viscosity Liquids - small scale* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.633 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 158.2 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Granular detergents are obtained by drying liquid slurries. *Applicable for granular cleaning and maintenance products (SpERC 2.1.c.v2)*
• Type of process: Substance applied in aqueous process solution with negligible volatilization *Applicable for liquid cleaning and maintenance products (SpERCs 2.1.i.v2)*
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Residues of granular detergents recovered in cleaning steps at packaging or transfer lines are recycled into the slurries. *Applicable for granular cleaning and maintenance products (SpERC 2.1.c.v2)*
• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater. *Applicable for liquid cleaning and maintenance products (SpERCs 2.1.i.v2)*

• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Waste treatment: Residues which cannot be recycled are disposed of as chemical waste
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse

4.2.4. Control of environmental exposure: *IFRA SG-4: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - large scale* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 1.266 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 316.5 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Substance applied in aqueous process solution with negligible volatilization
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Equipment cleaning with minimized emissions to wastewater (Typically implemented measures for reducing emissions to waste water may include: - Dry cleaning of equipment (Use of absorbent materials and vacuum cleaning including incineration of resulting solid waste) - Cleaning involving so-called pigs - Cleaning involving so-called ""cleaning in place"" (CIP System) - Steam cleaning and/or - Manual removal of residual products adhering to equipment (e.g. by manual scrubbing, vacuum cleaning, etc.) - use of two-liner systems (i.e. single use disposable reactor cover that is incinerated after use as solid waste))
• Process efficiency: Process optimized for highly efficient use of raw materials (II) (Typical measures may include e.g. - Closed automated process and/or - Closed transfer system and/or - Centralized process control and/or - re-use of process grey water for cleaning - optimized and/or automated systems for the transport and handling of raw materials, that minimize overall exposure levels and incidental spills - Reduced number of transfer and cleaning operations through e.g. - Manufacturing of different products from one premix (masterbatch), to which certain ingredients are added to yield the final products. - Dedicated storage tanks for raw materials, premixes and final products Recovery of materials through e.g. - Recycling Residues of granular detergents in cleaning steps at packaging or transfer lines into the slurries.)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to

national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse *Applicable for liquid cleaning and maintenance products (SpERC 2.1.j.v2)*

4.2.5. Control of environmental exposure: *IFRA SG-5: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - medium scale* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.633 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 158.2 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Substance applied in aqueous process solution with negligible volatilization
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Equipment cleaning with reduced emissions to wastewater (Typically implemented measures for reducing emissions to waste water may include: - Manual removal of residual products adhering to equipment (e.g. by manual scrubbing, vacuum cleaning, etc.) - use of two-liner systems (i.e. single use disposable reactor cover that is incinerated after use as solid waste))
• Process efficiency: Process optimized for efficient use of raw materials. (Typical measures may include e.g. - Closed batch systems and / or - Semi-closed transfer system and/or - Batch production of final product Reduced number of transfer and cleaning operations through e.g. - Dedicated storage tanks for raw materials, premixes and final products)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse *Applicable for liquid cleaning and maintenance products (SpERC 2.1.k.v2)*

4.2.6. Control of environmental exposure: *IFRA SG-6: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - small scale* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.317 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 79.1 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*

• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Substance applied in aqueous process solution with negligible volatilization
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse *Applicable for liquid cleaning and maintenance products (SpERC 2.1.l.v2)*

4.2.7. Control of environmental exposure: *IFRA SG-7: AISE & CE Fine Fragrances (cleaning with solvent) - all scales* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 20 tonnes/day *Total EU volume going to the market sector Fragrances (IFRA), used in 250 days/year*
• Annual use at a site: <= 5E3 tonnes/year *Total EU volume going to the market sector Fragrances (IFRA)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Technical and organisational conditions and measures
• Type of process: Solvent based process
• Indoor/outdoor use: Indoor Use
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process optimized for highly efficient use of raw materials (II) (Typical measures may include e.g. - Closed automated process and/or - Closed transfer system and/or - Centralized process control and/or - re-use of process grey water for cleaning - optimized and/or automated systems for the transport and handling of raw materials, that minimize overall exposure levels and incidental spills - Reduced number of transfer and cleaning operations through e.g. - Manufacturing of different products from one premix (masterbatch), to which certain ingredients are added to yield the final products. - Dedicated storage tanks for raw materials, premixes and final products Recovery of materials through e.g. - Recycling Residues of granular detergents in cleaning steps at packaging or transfer lines into the slurries.) *Applicable for large scale (SpERC 2.2.a.v2)*
• Process efficiency: Process optimized for efficient use of raw materials. (Typical measures may include e.g. - Closed batch systems and / or - Semi-closed transfer system and/or - Batch production of final product Reduced number of transfer and cleaning operations through e.g. - Dedicated storage tanks for raw materials, premixes and final products)

Applicable for medium scale (SpERC 2.2.b.v2)
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems) *Applicable for small scale (SpERC 2.2.c.v2)*
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low concentration) (Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

4.2.8. Control of environmental exposure: *IFRA SG-8: ERC2 default - all scales* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.063 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 15.8 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (AISE/CE): = 250 days/year (Equivalent to number of working days, based on sector knowledge)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

4.2.9. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Material transfers from/to vessel/container at dedicated facility (AISE M-6) **(PROC 8b)**	Covers concentrations up to 25 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
QC laboratory (AISE M-9) **(PROC 15)**	Covers concentrations up to 25 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Storage (AISE M-1) **(PROC 1)**	Covers concentrations up to 25 % Use in closed process, no likelihood of exposure
Mixing operations (closed systems) in batch process including filling of equipment and sample collection (AISE M-3) **(PROC 3)**	Covers concentrations up to 25 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Mixing operations (open systems) in batch process including filling of equipment and sample collection (AISE M-5) **(PROC 5)**	Covers concentrations up to 25 % Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Equipment cleaning and maintenance **(PROC 8a)**	Covers concentrations up to 1 %
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (AISE M-7) **(PROC 9)**	Covers concentrations up to 1 %
Production of preparations or articles by tabletting, compression, extrusion or pelletisation (AISE M-8) **(PROC 14)**	Covers concentrations up to 1 %

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: IFRA SG-1: AISE Granular & Low Viscosity Liquids - large scale (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) - AISE	**Initial release factor:** 0.01% **Final release factor:** 0.01% **Local release rate:** 1.266 kg/day **Explanation / Justification:** Releases to the wastewater can be the result of cleaning of mixing vessels, tubing, production/packaging lines with water. The spent cleaning water is discharged to the wastewater. The numbers that are presented in

Release	Release factor estimation method	Explanation / Justification
	2.1a.v2, AISE 2.1.g.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE Granular & Low Viscosity Liquids - large scale	this SPERC are consistent with the emissions used as default in published Life Cycle Inventories (LCI, Franke et al., 1991) for the manufacturing of detergents and cleaners. That publication formed the basis for the A/B Tables for detergent manufacturing in the EU Technical Guidance (EU TGD 2003). EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix 1 A Table A2 (p 226) Franke et al. 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32: 508-514
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Releases of raw materials via volatilization of granulars are non-existent. Releases of raw materials via volatilization are quantitatively very low. For that reason, the study by Royal Haskoning (2009) does not consider to establish release factors for the use of fragrance materials in the manufacturing of detergent products. For that reason, the release factor is set to zero. Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.755E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.2. Environmental release and exposure: IFRA SG-2: AISE Granular & Low Viscosity Liquids - medium scale (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) - AISE 2.1.b.v2, AISE 2.1.h.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE Granular & Low Viscosity Liquids - medium scale	**Initial release factor:** 0.1% **Final release factor:** 0.1% **Local release rate:** 1.266 kg/day **Explanation / Justification:** Releases to the wastewater can be the result of cleaning of mixing vessels, tubing, production/packaging lines with water. The spent cleaning water is discharged to the wastewater. The numbers for granular cleaning and maintenance products that are presented in this Sub-SpERC are consistent with the emissions used as default in published Life Cycle Inventories (LCI, Franke et al., 1991) for the manufacturing of detergents and cleaners. That publication formed the basis for the A/B Tables for detergent manufacturing in the EU Technical Guidance (EU TGD 2003). The numbers for liquid cleaning and maintenance products that are presented in this Sub-SpERC originate from the study by Royal Haskoning (2009). EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix 1 A Table A2 (p 226) Franke et al. 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32: 508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Releases of raw materials via volatilization of granulars are non-existent. Releases of raw materials via volatilization are quantitatively very low. For that reason, the study by Royal Haskoning (2009) does not consider to establish release factors for the use of fragrance materials in the manufacturing of detergent products. For that reason, the release factor is set to zero. Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.755E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.3. Environmental release and exposure: IFRA SG-3: AISE Granular & Low Viscosity Liquids - small scale (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) - AISE 2.1.c.v2, AISE 2.1.i.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE Granular & Low Viscosity Liquids - small scale	**Initial release factor:** 0.2% **Final release factor:** 0.2% **Local release rate:** 1.266 kg/day **Explanation / Justification:** Releases to the wastewater can be the result of cleaning of mixing vessels, tubing, production/packaging lines with water. The spent cleaning water is discharged to the wastewater. The numbers for granular cleaning and maintenance products that are presented in this SPERC are consistent with the emissions used as default in published Life Cycle Inventories (LCI, Franke et al., 1991) for the manufacturing of detergents and cleaners. That publication formed the basis for the A/B Tables for detergent manufacturing in the EU Technical Guidance (EU TGD 2003). The numbers for liquid cleaning and maintenance products that are presented in this SPERC originate from the study by Royal Haskoning (2009). EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix 1 A Table A2 (p 226) Franke et al. 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32: 508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Releases of raw materials via volatilization of granulars are non-existent. Releases of raw materials via volatilization are quantitatively very low. For that reason, the study by Royal Haskoning (2009) does not consider to establish release factors for the use of fragrance materials in the manufacturing of detergent products. For that reason, the release factor is set to zero.

Release	Release factor estimation method	Explanation / Justification
		Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.754E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.4. Environmental release and exposure: IFRA SG-4: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - large scale (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) - AISE 2.1.j.v2, CE/AISE 2.3.a.v2, CE 2.1.a.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE	**Initial release factor:** 0.1% **Final release factor:** 0.1% **Local release rate:** 1.266 kg/day **Explanation / Justification:** Releases to the wastewater can be the result of cleaning of mixing vessels, tubing, production/packaging lines with water. The spent cleaning water is discharged to the wastewater. The release factor for high viscosity liquid cleaning and maintenance products that is presented in this Sub-SpERC has been extrapolated by the A.I.S.E. sector expert team from the Royal Haskoning (2009) data based on the increasing degree of control of the manufacturing process from small to large scale. The number for solid cosmetic and home care products is equal to that for large production of soap in the study by Royal Haskoning (2009). The number for low

Release	Release factor estimation method	Explanation / Justification
	High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - large scale	viscosity liquid water-borne cosmetics is equal to that for large production of liquid conditioner, shampoos and shower gels in the study by Royal Haskoning (2009). This release factor is further supported by the Life Cycle Inventories of detergents (LCI, Franke et al., 1991). That publication formed the basis for the A/B Tables for detergent manufacturing in the EU Technical Guidance (EU TGD 2003). It is assumed that the findings for manufacturing detergent products apply for the manufacturing of personal care and cosmetics products. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix 1 A Table A2 (p 226) Franke et al. 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32: 508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Releases of raw materials via volatilization are quantitatively very low. For that reason, the study by Royal Haskoning (2009) does not consider to establish release factors for the use of fragrance materials in the manufacturing of detergent products. It is assumed that these findings also apply for the manufacturing of personal care and cosmetics products. For that reason, the release factor is set to zero. Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64

Protection target	Exposure concentration	Risk characterisation
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.755E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.5. Environmental release and exposure: IFRA SG-5: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - medium scale (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) - AISE 2.1.k.v2, CE/AISE 2.3.b.v2, CE 2.1.b.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - medium scale	**Initial release factor:** 0.2% **Final release factor:** 0.2% **Local release rate:** 1.266 kg/day **Explanation / Justification:** Releases to the wastewater can be the result of cleaning of mixing vessels, tubing, production/packaging lines with water. The spent cleaning water is discharged to the wastewater. The numbers for high viscosity liquid cleaning and maintenance products that are presented in this Sub-SpERC originate from the study by Royal Haskoning (2009). For solid cosmetic and home care products the Royal Haskoning data for small scale production of soap were adopted (in a conservative approach). For low viscosity liquid water-borne cosmetics the data for small scale production of liquid conditioner, shampoos and shower gels were adopted (in a conservative approach) Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Releases of raw materials via volatilization are quantitatively very low. For that reason, the study by Royal Haskoning (2009) does not consider to establish release factors for the use of fragrance materials in the manufacturing of detergent products. It is assumed that these findings also apply for the manufacturing of personal care and cosmetics products. For that reason, the release factor is set to zero. Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided.

Release	Release factor estimation method	Explanation / Justification
		EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.754E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.6. Environmental release and exposure: IFRA SG-6: AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - small scale (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance Substances - Version 2.1 of 11 December 2011) - AISE 2.1.l.v2, CE/AISE 2.3.c.v2, CE 2.1.c.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - small scale	**Initial release factor:** 0.4% **Final release factor:** 0.4% **Local release rate:** 1.266 kg/day **Explanation / Justification:** Releases to the wastewater can be the result of cleaning of mixing vessels, tubing, production/packaging lines with water. The spent cleaning water is discharged to the wastewater. The numbers for high viscosity liquid cleaning and maintenance products that are presented in this Sub-SpERC originate from the study by Royal Haskoning (2009). For solid cosmetic and home care products the number was extrapolated by the Cosmetics Europe and AISE sector expert teams based on the Royal Haskoning (2009) data. The number for liquid conditioner, shampoos and shower gels was extrapolated by the Cosmetics Europe sector expert team based on the Royal Haskoning data. Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Air	SpERC based	**Initial release factor:** 0% **Final release factor:** 0%

Release	Release factor estimation method	Explanation / Justification
	same as above	**Local release rate:** 0 kg/day **Explanation / Justification:** Releases of raw materials via volatilization are quantitatively very low. For that reason, the study by Royal Haskoning (2009) does not consider to establish release factors for the use of fragrance materials in the manufacturing of detergent products. It is assumed that these findings also apply for the manufacturing of personal care and cosmetics products. For that reason, the release factor is set to zero. Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.871 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.399E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.754E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.7. Environmental release and exposure: IFRA SG-7: AISE & CE Fine Fragrances (cleaning with solvent) - all scales (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based AISE v2 & CE v2 (Grouping according to Table 15.2 of IFRA Guidance REACH Exposure Scenarios for Fragrance	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** No wastewater treatment required.

Release	Release factor estimation method	Explanation / Justification
	Substances - Version 2.1 of 11 December 2011) - CE 2.2.a.v2, CE 2.2.b.v2, CE 2.2.c.v2 Industrial use in formulation of cleaning and maintenance products and cosmetics - AISE & CE Fine Fragrances (cleaning with solvent) - all scales	
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Air emission controls are not applicable as there is no direct release to air.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Must be avoided. EU TGD 2003 Technical Guidance Document on Risk Assessment. Part II, Appendix1 A Table A2 (p 226) Franke et al., 1995 Ökobilanzierung- Sachbilanz für die Waschmittel-Konfektionierung Tenside Surf. Det, 32:(508-514 Royal Haskoning 2009 Review and evaluation of environmental emission scenarios for fragrance materials during compounding of perfume oils and formulation of consumer products (Research Institute for Fragrance Materials Ref.:9S3975.01/R0007/Nijm, 2009).

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 1.321E-5 mg/kg dw	RCR < 0.01
Man via environment - Inhalation	**Local PEC:** 1.651E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 9.825E-4 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.0-5

4.3.8. Environmental release and exposure: IFRA SG-8: ERC2 default - all scales (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	ERC based	**Initial release factor:** 2% **Final release factor:** 2% **Local release rate:** 1.266 kg/day
Air	ERC based	**Initial release factor:** 2.5% **Final release factor:** 2.5% **Local release rate:** 1.582 kg/day
Soil	ERC based	**Final release factor:** 0.01%

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.398E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 4.66E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

4.3.9. Worker exposure: Material transfers from/to vessel/container at dedicated facility (AISE M-6) (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.411 mg/kg bw/day (TRA Workers 3.0)	0.046
Combined, systemic, long term		0.601

4.3.10. Worker exposure: QC laboratory (AISE M-9) (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.01 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.555

4.3.11. Worker exposure: Storage (AISE M-1) (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.034 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

4.3.12. Worker exposure: Mixing operations (closed systems) in batch process including filling of equipment and sample collection (AISE M-3) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	10.34 mg/m³ (TRA Workers 3.0)	0.333
Dermal, systemic, long term	0.021 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.335

4.3.13. Worker exposure: Mixing operations (open systems) in batch process including filling of equipment and sample collection (AISE M-5) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.411 mg/kg bw/day (TRA Workers 3.0)	0.046
Combined, systemic, long term		0.601

4.3.14. Worker exposure: Equipment cleaning and maintenance (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.339

4.3.15. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (AISE M-7) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.17

4.3.16. Worker exposure: Production of preparations or articles by tabletting, compression, extrusion or pelletisation (AISE M-8) (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.131

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.

- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

5. ES 5: Use at industrial sites; Perfumes, Fragrances (PC 28)

5.1. Title section

ES name: *GES3 - Industrial end-use of washing and cleaning products*
Product category: Perfumes, Fragrances (PC 28); PC 35: Washing and Cleaning Products (including solvent based products)

Environment	
1: *Industrial end-use of washing & cleaning products*	ERC 4
Worker	
2: *Industrial use of food beverage and pharmacos products; process cleaner; cleaning in place (CIP) process (AISE-P801); use phase and Industrial use of food beverage and pharmacos products; defoaming product; automatic process (AISE-P805); use phase*	PROC 1
3: *Industrial use of Laundry products; Laundry detergent; Automatic process (AISE-P101); Use Phase and Industrial use of Laundry products; Conditioner (softner/starch); Automatic process (AISE-P104); Use Phase and Industrial use of Laundry products; Laundry*	PROC 2
4: *Industrial use of pharmacos products; Disinfection product; Semi-automatic process (AISE-P810); Use Phase*	PROC 4
5: *Industrial use of Vehicle cleaning Products; Train cleaner; Semi-Automatic process (AISE-P707); Use Phase and Industrial use of Vehicle cleaning Products; Aeroplane cleaner; Semi-Automatic process (AISE-P708); Use Phase and Industrial Use of Vehicle clean*	PROC 4
6: *Industrial use of Water treatment Products; Preservation and sanitation agent ; Drink and pool water (AISE-P904); Use Phase and Industrial use of Water treatment Products; Sanitation agent; Waste water (AISE-P905); Use Phase*	PROC 4
7: *Industrial Use of Vehicle cleaning Products; Car wash product; Spray and rinse process (AISE-P710); Use Phase*	PROC 7
8: *Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); use phase*	PROC 7
9: *Industrial Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe process (AISE-P714); use phase*	PROC 7
10: *Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic with venting process (AISE-P806); Use Phase*	PROC 7
11: *Industrial use of Food beverage and pharmacos products - Chain maintenance product; Automatic spray process (AISE-P803); use phase*	PROC 7
12: *Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic without venting process (AISE-P807); Use Phase*	PROC 7
13: *Industrial use of Food beverage and pharmacos products - Animal housing care; Semi-Automatic process (AISE-P809); use phase*	PROC 7
14: *Industrial use of Food beverage and pharmacos products - Disinfection product; Fogging and gassing Semi-automatic (AISE-P811); use phase*	PROC 7
15: *Industrial Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P906); Use Phase*	PROC 7
16: *Industrial Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P907); Use Phase*	PROC 7
17: *Industrial use of Laundry products; Laundry detergent; Automatic process (AISE-P101); Preparatory Phase and Industrial use of Laundry products; Conditioner (softner/starch); Automatic process (AISE-P104); Preparatory Phase and Industrial use of Laundry pr*	PROC 8b

18: *Industrial use of Water treatment Products; Preservation and sanitation agent ; Drink and pool water (AISE-P904); Preparatory Phase and Industrial use of Water treatment Products; Sanitation agent; Waste water (AISE-P905); Preparatory Phase and Industrial*	PROC 8b
19: *Industrial use of Vehicle cleaning Products; Train cleaner; Semi-Automatic process (AISE-P707); Preparatory Phase and Industrial use of Vehicle cleaning Products; Aeroplane cleaner; Semi-Automatic process (AISE-P708); Preparatory Phase and Industrial Use*	PROC 8b
20: *Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); Preparatory Phase and Industrial Use of Vehicle cleaning Products; Boat cleaning; semi automatic (AISE-P713); Preparatory Phase and Industrial Use ofVehicle*	PROC 8b
21: *Industrial use of Food beverage and pharmacos products; Animal housing care; Semi-Automatic process (AISE-P809); Preparatory Phase and Industrial use of pharmacos products; Disinfection product; Semi-automatic process (AISE-P810); Preparatory Phase*	PROC 8b
22: *Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic with venting process (AISE-P806); Preparatory Phase*	PROC 8b
23: *Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); Use Phase*	PROC 10
24: *Industrial Use of Vehicle cleaning Products - Boat cleaning; semi-automatic (AISE-P713); use phase*	PROC 10
25: *Industrial Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe process (AISE-P714); use phase*	PROC 10
26: *Industrial use of Food beverage and pharmacos products; Chain maintenance product; Automatic drip and brush process (AISE-P804); Use Phase*	PROC 13

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: *Industrial end-use of washing & cleaning products* (ERC 4)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products. This approach can be justified since the total volume of fragrance substances that is applied for industrial use is only a fraction of the volumes going to consumer and professional uses. Also the industrial end-use products are similar to those used by professionals and consumers and release will be to the waste water stream. In industrial settings normally additional RMMs are available in form of on-site industrial Sewage Treatment Plants. The alternative approach can therefore be considered as a worst-case approach as only the municipal treatment plant is considered for wide-dispersive uses.

5.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 1 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

Specific conditions of use per contributing scenario

Contributing scenario	**Specific conditions of use**

Industrial use of food beverage and pharmacos products; process cleaner; cleaning in place (CIP) process (AISE-P801); use phase and Industrial use of food beverage and pharmacos products; defoaming product; automatic process (AISE-P805); use phase **(PROC 1)**	Use in closed process, no likelihood of exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial use of Laundry products; Laundry detergent; Automatic process (AISE-P101); Use Phase and Industrial use of Laundry products; Conditioner (softner/starch); Automatic process (AISE-P104); Use Phase and Industrial use of Laundry products; Laundry **(PROC 2)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Indoor use
Industrial use of pharmacos products; Disinfection product; Semi-automatic process (AISE-P810); Use Phase **(PROC 4)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial use of Vehicle cleaning Products; Train cleaner; Semi-Automatic process (AISE-P707); Use Phase and Industrial use of Vehicle cleaning Products; Aeroplane cleaner; Semi-Automatic process (AISE-P708); Use Phase and Industrial Use of Vehicle clean **(PROC 4)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial use of Water treatment Products; Preservation and sanitation agent ; Drink and pool water (AISE-P904); Use Phase and Industrial use of Water treatment Products; Sanitation agent; Waste water (AISE-P905); Use Phase **(PROC 4)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial Use of Vehicle cleaning Products; Car wash product; Spray and rinse process (AISE-P710); Use Phase **(PROC 7)**	*Limit the substance content in the product to 0.1%* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Outdoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); use	*Limit the substance content in the product to 0.1%* *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure

***phase* (PROC 7)**	Outdoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
***Industrial Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe process (AISE-P714); use phase* (PROC 7)**	*Limit the substance content in the product to 0.1%* *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Outdoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
***Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic with venting process (AISE-P806); Use Phase* (PROC 7)**	*Limit the substance content in the product to 0.1%* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
***Industrial use of Food beverage and pharmacos products - Chain maintenance product; Automatic spray process (AISE-P803); use phase* (PROC 7)**	*Limit the substance content in the product to 0.1%* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
***Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic without venting process (AISE-P807); Use Phase* (PROC 7)**	*Limit the substance content in the product to 0.1%* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
***Industrial use of Food beverage and pharmacos products - Animal housing care; Semi-Automatic process (AISE-P809); use phase* (PROC 7)**	*Limit the substance content in the product to 0.1%* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
***Industrial use of Food beverage and pharmacos products - Disinfection product; Fogging and gassing Semi-automatic (AISE-P811); use phase* (PROC 7)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

	Wear a respirator providing a minimum efficiency of 95 % Indoor use Spraying; Large scale
Industrial Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P906); Use Phase **(PROC 7)**	*Limit the substance content in the product to 0.1%* *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Industrial Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P907); Use Phase **(PROC 7)**	*Limit the substance content in the product to 0.1%* *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Industrial use of Laundry products; Laundry detergent; Automatic process (AISE-P101); Preparatory Phase and Industrial use of Laundry products; Conditioner (softner/starch); Automatic process (AISE-P104); Preparatory Phase and Industrial use of Laundry pr **(PROC 8b)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial use of Water treatment Products; Preservation and sanitation agent ; Drink and pool water (AISE-P904); Preparatory Phase and Industrial use of Water treatment Products; Sanitation agent; Waste water (AISE-P905); Preparatory Phase and Industrial **(PROC 8b)**	Outdoor use
Industrial use of Vehicle cleaning Products; Train cleaner; Semi-Automatic process (AISE-P707); Preparatory Phase and Industrial use of Vehicle cleaning Products; Aeroplane cleaner; Semi-Automatic process (AISE-P708); Preparatory Phase and Industrial Use **(PROC 8b)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe	Outdoor use

process (AISE-P711); Preparatory Phase and Industrial Use of Vehicle cleaning Products; Boat cleaning; semi automatic (AISE-P713); Preparatory Phase and Industrial Use ofVehicle **(PROC 8b)**	
Industrial use of Food beverage and pharmacos products; Animal housing care; Semi-Automatic process (AISE-P809); Preparatory Phase and Industrial use of pharmacos products; Disinfection product; Semi-automatic process (AISE-P810); Preparatory Phase **(PROC 8b)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic with venting process (AISE-P806); Preparatory Phase **(PROC 8b)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); Use Phase **(PROC 10)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Outdoor use *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Industrial Use of Vehicle cleaning Products - Boat cleaning; semi-automatic (AISE-P713); use phase **(PROC 10)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Outdoor use *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Industrial Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe process (AISE-P714); use phase **(PROC 10)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Outdoor use *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Industrial use of Food beverage and pharmacos products; Chain maintenance product; Automatic drip and brush process (AISE-P804); Use Phase **(PROC 13)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Industrial end-use of washing & cleaning products (ERC 4)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

5.3.2. Worker exposure: Industrial use of food beverage and pharmacos products; process cleaner; cleaning in place (CIP) process (AISE-P801); use phase and Industrial use of food beverage and pharmacos products; defoaming product; automatic process (AISE-P805); use phase (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.75E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	3.4E-3 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.3.3. Worker exposure: Industrial use of Laundry products; Laundry detergent; Automatic process (AISE-P101); Use Phase and Industrial use of Laundry products; Conditioner (softner/starch); Automatic process (AISE-P104); Use Phase and Industrial use of Laundry products; Laundry (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.575 mg/m³ (TRA Workers 3.0)	0.018
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.034

5.3.4. Worker exposure: Industrial use of pharmacos products; Disinfection product; Semi-automatic process (AISE-P810); Use Phase (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.17

5.3.5. Worker exposure: Industrial use of Vehicle cleaning Products; Train cleaner; Semi-Automatic process (AISE-P707); Use Phase and Industrial use of Vehicle cleaning Products; Aeroplane cleaner; Semi-Automatic process (AISE-P708); Use Phase and Industrial Use of Vehicle clean (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.17

5.3.6. Worker exposure: Industrial use of Water treatment Products; Preservation and sanitation agent ; Drink and pool water (AISE-P904); Use Phase and Industrial use of Water treatment Products; Sanitation agent; Waste water (AISE-P905); Use Phase (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.17

5.3.7. Worker exposure: Industrial Use of Vehicle cleaning Products; Car wash product; Spray and rinse process (AISE-P710); Use Phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.836

5.3.8. Worker exposure: Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); use phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.6 mg/m³ (ART 1.5)	0.277
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.759

5.3.9. Worker exposure: Industrial Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe process (AISE-P714); use phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.6 mg/m³ (ART 1.5)	0.277
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.759

5.3.10. Worker exposure: Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic with venting process (AISE-P806); Use Phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.836

5.3.11. Worker exposure: Industrial use of Food beverage and pharmacos products - Chain maintenance product; Automatic spray process (AISE-P803); use phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.836

5.3.12. Worker exposure: Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic without venting process (AISE-P807); Use Phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.836

5.3.13. Worker exposure: Industrial use of Food beverage and pharmacos products - Animal housing care; Semi-Automatic process (AISE-P809); use phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.836

5.3.14. Worker exposure: Industrial use of Food beverage and pharmacos products - Disinfection product; Fogging and gassing Semi-automatic (AISE-P811); use phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	0.429 mg/kg bw/day (TRA Workers 3.0)	0.048
Combined, systemic, long term		0.563

5.3.15. Worker exposure: Industrial Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P906); Use Phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.6 mg/m³ (ART 1.5)	0.277
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.759

5.3.16. Worker exposure: Industrial Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P907); Use Phase (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.6 mg/m³ (ART 1.5)	0.277

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.482
Combined, systemic, long term		0.759

5.3.17. Worker exposure: Industrial use of Laundry products; Laundry detergent; Automatic process (AISE-P101); Preparatory Phase and Industrial use of Laundry products; Conditioner (softner/starch); Automatic process (AISE-P104); Preparatory Phase and Industrial use of Laundry pr (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.247

5.3.18. Worker exposure: Industrial use of Water treatment Products; Preservation and sanitation agent ; Drink and pool water (AISE-P904); Preparatory Phase and Industrial use of Water treatment Products; Sanitation agent; Waste water (AISE-P905); Preparatory Phase and Industrial (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.011 mg/m³ (TRA Workers 3.0)	0.065
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.219

5.3.19. Worker exposure: Industrial use of Vehicle cleaning Products; Train cleaner; Semi-Automatic process (AISE-P707); Preparatory Phase and Industrial use of Vehicle cleaning Products; Aeroplane cleaner; Semi-Automatic process (AISE-P708); Preparatory Phase and Industrial Use (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.247

5.3.20. Worker exposure: Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); Preparatory Phase and Industrial Use of Vehicle cleaning Products; Boat cleaning; semi automatic (AISE-P713); Preparatory Phase and Industrial Use ofVehicle (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.011 mg/m³ (TRA Workers 3.0)	0.065
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.219

5.3.21. Worker exposure: Industrial use of Food beverage and pharmacos products; Animal housing care; Semi-Automatic process (AISE-P809); Preparatory Phase and Industrial use of pharmacos products; Disinfection product; Semi-automatic process (AISE-P810); Preparatory Phase (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.247

5.3.22. Worker exposure: Industrial use of Food beverage and pharmacos products; Foam cleaner; Semi-Automatic with venting process (AISE-P806); Preparatory Phase (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.247

5.3.23. Worker exposure: Industrial Use of Vehicle cleaning Products; Car wash product; Spray and wipe process (AISE-P711); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.022 mg/m³ (TRA Workers 3.0)	0.129
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.438

5.3.24. Worker exposure: Industrial Use of Vehicle cleaning Products - Boat cleaning; semi-automatic (AISE-P713); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.022 mg/m³ (TRA Workers 3.0)	0.129
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.438

5.3.25. Worker exposure: Industrial Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe process (AISE-P714); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.022 mg/m³ (TRA Workers 3.0)	0.129
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.438

5.3.26. Worker exposure: Industrial use of Food beverage and pharmacos products; Chain maintenance product; Automatic drip and brush process (AISE-P804); Use Phase (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.339

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

6. ES 6: Widespread use by professional workers; Perfumes, Fragrances (PC 28)

6.1. Title section

ES name: *GES4 - Professional end-use of washing and cleaning products*
Product category: Perfumes, Fragrances (PC 28); PC 35: Washing and Cleaning Products (including solvent based products)

Environment	
1: *Professional end-use of washing and cleaning products*	ERC 8a
Worker	
2: *Professional Use of Laundry products ; Laundry detergent; Semi automatic process (AISE-P102); Use Phase and Professional Use of Laundry products ; Conditioner (softener/starch); Semi automatic process (AISE-P105); Use Phase and Professional Use of Laundr*	PROC 1
3: *Professional Use of Dishwash products; Dishwash and rinse aid product; Automatic process (AISE-P202); Use Phase*	PROC 2
4: *Professional Use of Laundry products ; Laundry aid (non-gasing); Manual process (AISE-P112); Use Phase*	PROC 4
5: *Professional Use of Vehicle cleaning Products; Car wash product; Semi-Automatic process (AISE-P701); Use Phase and Professional Use of Vehicle cleaning Products; Dewaxing product; Semi-Automatic process (AISE-P704); Use Phase*	PROC 4
6: *Professional Use of Laundry products ; Laundry detergent; Semi automatic process (AISE-P102); Preparatory Phase and Professional Use of Laundry products ; Conditioner (softener/starch); Semi automatic process (AISE-P105); Preparatory Phase and Profession*	PROC 8a
7: *Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P901); Preparatory Phase and Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Prepa*	PROC 8a
8: *Professional Use of Dishwash products; Dishwash product; Manual process (AISE-P201); Preparatory Phase*	PROC 8a
9: *Professional Use of Floor care products; Floor cleaner; Manual process (AISE-P403); Preparatory Phase and Professional Use of General surface cleaning products; General purpose cleaner; Manual process (AISE-P301); Preparatory Phase and Professional Use o*	PROC 8a
10: *Professional Use of Vehicle cleaning Products; Car wash product; Semi-Automatic process (AISE-P701); Preparatory Phase and Professional Use of Vehicle cleaning Products; Car wash product; Spray - Manual process (AISE-P702); Preparatory Phase and Professi*	PROC 8a
11: *Professional Use of Vehicle cleaning Products; Car wash product; Spray and Wipe manual process (AISE-P703); Preparatory Phase and Professional Use of Vehicle cleaning Products; Boat cleaner; Manual process (AISE-P705); Preparatory Phase and Professional U*	PROC 8a
12: *Professional Use of Dishwash products; Dishwash and rinse aid product; Automatic process (AISE-P202); Preparatory Phase*	PROC 8b
13: *Professional Use of General surface cleaning products; Oven/Grill Cleaner; Manual process (AISE-P310); Use Phase*	PROC 10
14: *Professional Use of Laundry products ; Laundry detergent; Manual process (AISE-P103); Use Phase*	PROC 10
15: *Professional Use of Dishwash products - Dishwash product; Manual process (AISE-P201); use phase*	PROC 10

16: *Professional Use of General surface cleaning products - Wet wipes; Manual process (AISE-P317); use phase*	PROC 10
17: *Professional Use of Floor care products - Carpet pre-spotters; Spray and brush manual process (AISE-P411); use phase*	PROC 10
18: *Professional Use of General surface cleaning products; Descaling agent; Manual process (AISE-P307); Use Phase*	PROC 10
19: *Professional Use of Floor care products; Floor cleaner; Manual process (AISE-P403); Use Phase*	PROC 10
20: *Professional Use of Laundry products - Prespotter/Stain remover; Manual process (AISE-P113); use phase*	PROC 10
21: *Professional Use of General surface cleaning products - General purpose cleaner; Manual process (AISE-P301); use phase*	PROC 10
22: *Professional Use of General surface cleaning products - General purpose cleaner; Spray and wipe; manual process (AISE-P302); use phase*	PROC 10
23: *Professional Use of General surface cleaning products - Kitchen cleaner; Manual process (AISE-P303); use phase*	PROC 10
24: *Professional Use of General surface cleaning products - Kitchen cleaner; Spray and wipe manual process (AISE-P304); use phase*	PROC 10
25: *Professional Use of General surface cleaning products - Sanitary cleaner; Manual process (AISE-P305); use phase*	PROC 10
26: *Professional Use of General surface cleaning products; Sanitary cleaner; Wipe manual process (AISE-P306); Use Phase*	PROC 10
27: *Professional Use of General surface cleaning products - Glass cleaner; Manual process (AISE-P312); use phase*	PROC 10
28: *Professional Use of General surface cleaning products - Glass cleaner ; Spray and wipe manual process (AISE-P313); use phase*	PROC 10
29: *Professional Use of General surface cleaning products - Surface disinfectant; Manual process (AISE-P314); use phase*	PROC 10
30: *Professional Use of General surface cleaning products - Surface disinfectant; Spray and rinse manual process (AISE-P315); use phase*	PROC 10
31: *Professional Use of General surface cleaning products - Metal cleaning agent (including silver and copper polishes); Manual process (AISE-P316); use phase*	PROC 10
32: *Professional Use of Floor care products - Floor cleaner; Semi-Automatic process (AISE-P401); use phase*	PROC 10
33: *Professional Use of Floor care products - Floor cleaner; Spray and wipe manual process (AISE-P402); use phase*	PROC 10
34: *Professional Use of Floor care products - Floor stripper; Semi-Automatic process (AISE-P405); use phase*	PROC 10
35: *Professional Use of Floor care products - Carpet cleaner; Manual process (AISE-P409); use phase*	PROC 10
36: *Professional Use of Floor care products - Carpet cleaner; Semi-Automatic process (AISE-P410); use phase*	PROC 10
37: *Professional Use of pharmacos products - Animal care; Manual process (AISE-P808); use phase*	PROC 10
38: *Professional Use of Medical Devices - Medical devices ; Manual process (AISE-P1103); use phase*	PROC 10
39: *Professional Use of Medical Devices - Medical devices ; Spray and wipe process (AISE-P1104); use phase*	PROC 10
40: *Professional Use of General surface cleaning products; Descaling agent; Rinse manual process (AISE-P308); Use Phase*	PROC 10
41: *Professional Use of General surface cleaning products - Oven/Grill Cleaner; Spray*	PROC 10

and wipe manual process (AISE-P311); use phase	
42: *Professional Use of Floor care products - Floor stripper; Manual process (AISE-P404); use phase*	PROC 10
43: *Professional Use of Vehicle cleaning Products; Car wash product; Wipe manual process (AISE-P703); Use Phase*	PROC 10
44: *Professional Use of Vehicle cleaning Products - Boat cleaner; Manual process (AISE-P705); use phase*	PROC 10
45: *Professional Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe manual process (AISE-P706); use phase*	PROC 10
46: *Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Use Phase*	PROC 10
47: *Professional Use of Vehicle cleaning Products; Car wash product; Spray - Manual process (AISE-P702); Use Phase*	PROC 11
48: *Professional Use of Laundry products - Prespotter/Stain remover; Manual process (AISE-P113); use phase*	PROC 11
49: *Professional Use of General surface cleaning products - General purpose cleaner; Spray and wipe; manual process (AISE-P302); use phase*	PROC 11
50: *Professional Use of General surface cleaning products - Kitchen cleaner; Spray and wipe manual process (AISE-P304); use phase*	PROC 11
51: *Professional Use of General surface cleaning products - Sanitary cleaner; Spray and wipe manual process (AISE-P306); use phase*	PROC 11
52: *Professional Use of General surface cleaning products - Glass cleaner ; Spray and wipe manual process (AISE-P313); use phase*	PROC 11
53: *Professional Use of General surface cleaning products - Surface disinfectant; Spray and rinse manual process (AISE-P315); use phase*	PROC 11
54: *Professional Use of Floor care products - Floor cleaner; Spray and wipe manual process (AISE-P402); use phase*	PROC 11
55: *Professional Use of Floor care products - Carpet pre-spotters; Spray and brush manual process (AISE-P411); use phase*	PROC 11
56: *Professional Use of Medical Devices - Medical devices ; Spray and wipe process (AISE-P1104); use phase*	PROC 11
57: *Professional Use of General surface cleaning products; Descaling agent; Spray manual process (AISE-P308); Use Phase*	PROC 11
58: *Professional Use of General surface cleaning products - Oven/Grill Cleaner; Spray and wipe manual process (AISE-P311); use phase*	PROC 11
59: *Professional Use of Vehicle cleaning Products; Car wash product; Spray manual process (AISE-P703); Use Phase*	PROC 11
60: *Professional Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe manual process (AISE-P706); use phase*	PROC 11
61: *Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Use Phase*	PROC 11
62: *Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P901); Use Phase*	PROC 11
63: *Professional Use of Maintenance Products; Drain unblocker; Manual process (AISE-P606); Use Phase and Professional Use of Maintenance Products; Drain cleaner; Manual process (AISE-P607); Use Phase*	PROC 13
64: *Professional Use of General surface cleaning products; Periodic cleaning by dipping (AISE-P309); Use Phase and Professional Use of Medical Devices; Medical devices ; Dipping process (AISE-P1102); Use Phase*	PROC 13

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: *Professional end-use of washing and cleaning products* (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products

6.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 1 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Professional Use of Laundry products ; Laundry detergent; Semi automatic process (AISE-P102); Use Phase and Professional Use of Laundry products ; Conditioner (softener/starch); Semi automatic process (AISE-P105); Use Phase and Professional Use of Laundr **(PROC 1)**	Use in closed process, no likelihood of exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Dishwash products; Dishwash and rinse aid product; Automatic process (AISE-P202); Use Phase **(PROC 2)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Indoor use
Professional Use of Laundry products ; Laundry aid (non-gasing); Manual process (AISE-P112); Use Phase **(PROC 4)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Vehicle cleaning Products; Car wash product; Semi-Automatic process (AISE-P701); Use Phase and Professional Use of Vehicle cleaning Products; Dewaxing product; Semi-Automatic process (AISE-P704); Use Phase **(PROC 4)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Laundry products ; Laundry detergent; Semi automatic process (AISE-P102); Preparatory Phase and Professional Use of Laundry products ; Conditioner (softener/starch); Semi	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use

automatic process (AISE-P105); Preparatory Phase and Profession **(PROC 8a)**	
Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P901); Preparatory Phase and Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Prepa **(PROC 8a)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Dishwash products; Dishwash product; Manual process (AISE-P201); Preparatory Phase **(PROC 8a)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Floor care products; Floor cleaner; Manual process (AISE-P403); Preparatory Phase and Professional Use of General surface cleaning products; General purpose cleaner; Manual process (AISE-P301); Preparatory Phase and Professional Use o **(PROC 8a)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Vehicle cleaning Products; Car wash product; Semi-Automatic process (AISE-P701); Preparatory Phase and Professional Use of Vehicle cleaning Products; Car wash product; Spray - Manual process (AISE-P702); Preparatory Phase and Professi **(PROC 8a)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of Vehicle cleaning Products; Car wash product; Spray and Wipe manual process (AISE-P703); Preparatory Phase and Professional Use of Vehicle cleaning Products; Boat cleaner; Manual process (AISE-P705); Preparatory Phase and Professional U **(PROC 8a)**	Outdoor use
Professional Use of Dishwash products; Dishwash and rinse aid product; Automatic process (AISE-P202); Preparatory Phase **(PROC 8b)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Professional Use of General surface cleaning products;	*General good housekeeping practices.* *General ventilation giving at least 3 ACH*

Oven/Grill Cleaner; Manual process (AISE-P310); Use Phase **(PROC 10)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Laundry products ; Laundry detergent; Manual process (AISE-P103); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Dishwash products - Dishwash product; Manual process (AISE-P201); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Wet wipes; Manual process (AISE-P317); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Carpet pre-spotters; Spray and brush manual process (AISE-P411); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products; Descaling agent; Manual process (AISE-P307); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products; Floor cleaner; Manual process (AISE-P403); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Laundry products - Prespotter/Stain remover; Manual process (AISE-P113); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - General purpose cleaner; Manual process (AISE-P301); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - General purpose cleaner; Spray and wipe; manual	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use

process (AISE-P302); use phase **(PROC 10)**	Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Kitchen cleaner; Manual process (AISE-P303); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Kitchen cleaner; Spray and wipe manual process (AISE-P304); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Sanitary cleaner; Manual process (AISE-P305); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products; Sanitary cleaner; Wipe manual process (AISE-P306); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Glass cleaner; Manual process (AISE-P312); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Glass cleaner ; Spray and wipe manual process (AISE-P313); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Surface disinfectant; Manual process (AISE-P314); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Surface disinfectant; Spray and rinse manual process (AISE-P315); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products - Metal cleaning agent (including silver and copper polishes); Manual process (AISE-P316); use phase	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*

(PROC 10)	
Professional Use of Floor care products - Floor cleaner; Semi-Automatic process (AISE-P401); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Floor cleaner; Spray and wipe manual process (AISE-P402); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Floor stripper; Semi-Automatic process (AISE-P405); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Carpet cleaner; Manual process (AISE-P409); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Carpet cleaner; Semi-Automatic process (AISE-P410); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of pharmacos products - Animal care; Manual process (AISE-P808); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Medical Devices - Medical devices ; Manual process (AISE-P1103); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Medical Devices - Medical devices ; Spray and wipe process (AISE-P1104); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General surface cleaning products; Descaling agent; Rinse manual process (AISE-P308); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of General	*General good housekeeping practices.*

surface cleaning products - Oven/Grill Cleaner; Spray and wipe manual process (AISE-P311); use phase **(PROC 10)**	*General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Floor stripper; Manual process (AISE-P404); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Vehicle cleaning Products; Car wash product; Wipe manual process (AISE-P703); Use Phase **(PROC 10)**	*Covers sources located close to buildings* *General good housekeeping practices.* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Vehicle cleaning Products - Boat cleaner; Manual process (AISE-P705); use phase **(PROC 10)**	*Covers sources located close to buildings* *General good housekeeping practices.* *Spreading of liquids at surfaces or work pieces > 3 m² / hour* Outdoor use
Professional Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe manual process (AISE-P706); use phase **(PROC 10)**	*Covers sources located close to buildings* *General good housekeeping practices.* *Spreading of liquids at surfaces or work pieces > 3 m² / hour* Outdoor use
Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Outdoor use Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Vehicle cleaning Products; Car wash product; Spray - Manual process (AISE-P702); Use Phase **(PROC 11)**	*Limit the substance content in the product to 0.1%* *General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Laundry products - Prespotter/Stain remover; Manual process (AISE-P113); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use

Professional Use of General surface cleaning products - General purpose cleaner; Spray and wipe; manual process (AISE-P302); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of General surface cleaning products - Kitchen cleaner; Spray and wipe manual process (AISE-P304); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of General surface cleaning products - Sanitary cleaner; Spray and wipe manual process (AISE-P306); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of General surface cleaning products - Glass cleaner ; Spray and wipe manual process (AISE-P313); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of General surface cleaning products - Surface disinfectant; Spray and rinse manual process (AISE-P315); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute)

	Surface spraying of liquids Spraying with high compressed air use
Professional Use of Floor care products - Floor cleaner; Spray and wipe manual process (AISE-P402); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Floor care products - Carpet pre-spotters; Spray and brush manual process (AISE-P411); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Medical Devices - Medical devices ; Spray and wipe process (AISE-P1104); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of General surface cleaning products; Descaling agent; Spray manual process (AISE-P308); Use Phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of General surface cleaning products - Oven/Grill Cleaner; Spray and wipe manual process (AISE-P311); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

	Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Vehicle cleaning Products; Car wash product; Spray manual process (AISE-P703); Use Phase **(PROC 11)**	*Limit the substance content in the product to 0.1%* *Covers sources located close to buildings* *General good housekeeping practices.* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe manual process (AISE-P706); use phase **(PROC 11)**	*Limit the substance content in the product to 0.1%* *Covers sources located close to buildings* *General good housekeeping practices.* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Use Phase **(PROC 11)**	*Limit the substance content in the product to 0.1%* *General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P901); Use Phase **(PROC 11)**	*Limit the substance content in the product to 0.1%* *General good housekeeping practices.* *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Maintenance Products; Drain	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use

unblocker; Manual process (AISE-P606); Use Phase and Professional Use of Maintenance Products; Drain cleaner; Manual process (AISE-P607); Use Phase **(PROC 13)**	
Professional Use of General surface cleaning products; Periodic cleaning by dipping (AISE-P309); Use Phase and Professional Use of Medical Devices; Medical devices ; Dipping process (AISE-P1102); Use Phase **(PROC 13)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Professional end-use of washing and cleaning products (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

6.3.2. Worker exposure: Professional Use of Laundry products ; Laundry detergent; Semi automatic process (AISE-P102); Use Phase and Professional Use of Laundry products ; Conditioner (softener/starch); Semi automatic process (AISE-P105); Use Phase and Professional Use of Laundr (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.75E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	3.4E-3 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

6.3.3. Worker exposure: Professional Use of Dishwash products; Dishwash and rinse aid product; Automatic process (AISE-P202); Use Phase (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.108

6.3.4. Worker exposure: Professional Use of Laundry products ; Laundry aid (non-gasing); Manual process (AISE-P112); Use Phase (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.262

6.3.5. Worker exposure: Professional Use of Vehicle cleaning Products; Car wash product; Semi-Automatic process (AISE-P701); Use Phase and Professional Use of Vehicle cleaning Products; Dewaxing product; Semi-Automatic process (AISE-P704); Use Phase (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.262

6.3.6. Worker exposure: Professional Use of Laundry products ; Laundry detergent; Semi automatic

process (AISE-P102); Preparatory Phase and Professional Use of Laundry products ; Conditioner (softener/starch); Semi automatic process (AISE-P105); Preparatory Phase and Profession (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.36 mg/m³ (TRA Workers 3.0)	0.462
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.616

6.3.7. Worker exposure: Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P901); Preparatory Phase and Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Prepa (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.36 mg/m³ (TRA Workers 3.0)	0.462
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.616

6.3.8. Worker exposure: Professional Use of Dishwash products; Dishwash product; Manual process (AISE-P201); Preparatory Phase (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.36 mg/m³ (TRA Workers 3.0)	0.462
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.616

6.3.9. Worker exposure: Professional Use of Floor care products; Floor cleaner; Manual process (AISE-P403); Preparatory Phase and Professional Use of General surface cleaning products; General purpose cleaner; Manual process (AISE-P301); Preparatory Phase and Professional Use o (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.36 mg/m³ (TRA Workers 3.0)	0.462
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.616

6.3.10. Worker exposure: Professional Use of Vehicle cleaning Products; Car wash product; Semi-Automatic process (AISE-P701); Preparatory Phase and Professional Use of Vehicle cleaning Products; Car wash product; Spray - Manual process (AISE-P702); Preparatory Phase and Professi (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.36 mg/m³ (TRA Workers 3.0)	0.462
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.616

6.3.11. Worker exposure: Professional Use of Vehicle cleaning Products; Car wash product; Spray and Wipe manual process (AISE-P703); Preparatory Phase and Professional Use of Vehicle cleaning Products; Boat cleaner; Manual process (AISE-P705); Preparatory Phase and Professional U (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	10.05 mg/m³ (TRA Workers 3.0)	0.323
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.478

6.3.12. Worker exposure: Professional Use of Dishwash products; Dishwash and rinse aid product; Automatic process (AISE-P202); Preparatory Phase (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.339

6.3.13. Worker exposure: Professional Use of General surface cleaning products; Oven/Grill Cleaner; Manual process (AISE-P310); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.14. Worker exposure: Professional Use of Laundry products ; Laundry detergent; Manual process (AISE-P103); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.15. Worker exposure: Professional Use of Dishwash products - Dishwash product; Manual process (AISE-P201); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.16. Worker exposure: Professional Use of General surface cleaning products - Wet wipes; Manual process (AISE-P317); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.17. Worker exposure: Professional Use of Floor care products - Carpet pre-spotters; Spray and brush manual process (AISE-P411); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.18. Worker exposure: Professional Use of General surface cleaning products; Descaling agent; Manual process (AISE-P307); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.19. Worker exposure: Professional Use of Floor care products; Floor cleaner; Manual process (AISE-P403); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.20. Worker exposure: Professional Use of Laundry products - Prespotter/Stain remover; Manual process (AISE-P113); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.21. Worker exposure: Professional Use of General surface cleaning products - General purpose cleaner; Manual process (AISE-P301); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.22. Worker exposure: Professional Use of General surface cleaning products - General purpose cleaner; Spray and wipe; manual process (AISE-P302); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.23. Worker exposure: Professional Use of General surface cleaning products - Kitchen cleaner; Manual process (AISE-P303); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.24. Worker exposure: Professional Use of General surface cleaning products - Kitchen cleaner; Spray and wipe manual process (AISE-P304); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.25. Worker exposure: Professional Use of General surface cleaning products - Sanitary cleaner; Manual process (AISE-P305); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.26. Worker exposure: Professional Use of General surface cleaning products; Sanitary cleaner; Wipe manual process (AISE-P306); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.27. Worker exposure: Professional Use of General surface cleaning products - Glass cleaner; Manual process (AISE-P312); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.28. Worker exposure: Professional Use of General surface cleaning products - Glass cleaner ; Spray and wipe manual process (AISE-P313); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.29. Worker exposure: Professional Use of General surface cleaning products - Surface disinfectant; Manual process (AISE-P314); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.30. Worker exposure: Professional Use of General surface cleaning products - Surface disinfectant; Spray and rinse manual process (AISE-P315); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.31. Worker exposure: Professional Use of General surface cleaning products - Metal cleaning agent (including silver and copper polishes); Manual process (AISE-P316); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.32. Worker exposure: Professional Use of Floor care products - Floor cleaner; Semi-Automatic process (AISE-P401); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.33. Worker exposure: Professional Use of Floor care products - Floor cleaner; Spray and wipe manual process (AISE-P402); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.34. Worker exposure: Professional Use of Floor care products - Floor stripper; Semi-Automatic process (AISE-P405); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.572

6.3.35. Worker exposure: Professional Use of Floor care products - Carpet cleaner; Manual process (AISE-P409); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.36. Worker exposure: Professional Use of Floor care products - Carpet cleaner; Semi-Automatic process (AISE-P410); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.37. Worker exposure: Professional Use of pharmacos products - Animal care; Manual process (AISE-P808); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.38. Worker exposure: Professional Use of Medical Devices - Medical devices ; Manual process (AISE-P1103); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.39. Worker exposure: Professional Use of Medical Devices - Medical devices ; Spray and wipe process (AISE-P1104); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.40. Worker exposure: Professional Use of General surface cleaning products; Descaling agent; Rinse manual process (AISE-P308); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.41. Worker exposure: Professional Use of General surface cleaning products - Oven/Grill Cleaner; Spray and wipe manual process (AISE-P311); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.42. Worker exposure: Professional Use of Floor care products - Floor stripper; Manual process (AISE-P404); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.43. Worker exposure: Professional Use of Vehicle cleaning Products; Car wash product; Wipe manual process (AISE-P703); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.6 mg/m³ (ART 1.5)	0.116
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.424

6.3.44. Worker exposure: Professional Use of Vehicle cleaning Products - Boat cleaner; Manual process (AISE-P705); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.6 mg/m³ (ART 1.5)	0.116
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.424

6.3.45. Worker exposure: Professional Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe manual process (AISE-P706); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.6 mg/m³ (ART 1.5)	0.116
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.424

6.3.46. Worker exposure: Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

6.3.47. Worker exposure: Professional Use of Vehicle cleaning Products; Car wash product; Spray - Manual process (AISE-P702); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.474

6.3.48. Worker exposure: Professional Use of Laundry products - Prespotter/Stain remover; Manual process (AISE-P113); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.49. Worker exposure: Professional Use of General surface cleaning products - General purpose cleaner; Spray and wipe; manual process (AISE-P302); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.50. Worker exposure: Professional Use of General surface cleaning products - Kitchen cleaner; Spray and wipe manual process (AISE-P304); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.51. Worker exposure: Professional Use of General surface cleaning products - Sanitary cleaner; Spray and wipe manual process (AISE-P306); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.52. Worker exposure: Professional Use of General surface cleaning products - Glass cleaner ; Spray and wipe manual process (AISE-P313); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.53. Worker exposure: Professional Use of General surface cleaning products - Surface disinfectant; Spray and rinse manual process (AISE-P315); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.54. Worker exposure: Professional Use of Floor care products - Floor cleaner; Spray and wipe manual process (AISE-P402); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.55. Worker exposure: Professional Use of Floor care products - Carpet pre-spotters; Spray and brush manual process (AISE-P411); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.56. Worker exposure: Professional Use of Medical Devices - Medical devices ; Spray and wipe process (AISE-P1104); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.57. Worker exposure: Professional Use of General surface cleaning products; Descaling agent; Spray manual process (AISE-P308); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.58. Worker exposure: Professional Use of General surface cleaning products - Oven/Grill Cleaner; Spray and wipe manual process (AISE-P311); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

6.3.59. Worker exposure: Professional Use of Vehicle cleaning Products; Car wash product; Spray manual process (AISE-P703); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.6 mg/m³ (ART 1.5)	0.277
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.397

6.3.60. Worker exposure: Professional Use of Vehicle cleaning Products - Boat cleaner; Spray and wipe manual process (AISE-P706); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.6 mg/m³ (ART 1.5)	0.277
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.397

6.3.61. Worker exposure: Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; Medium pressure process (AISE-P902); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.474

6.3.62. Worker exposure: Professional Use of Façade/surface Cleaning Products; Façade/surface cleaner; High pressure process (AISE-P901); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.474

6.3.63. Worker exposure: Professional Use of Maintenance Products; Drain unblocker; Manual process (AISE-P606); Use Phase and Professional Use of Maintenance Products; Drain cleaner; Manual process (AISE-P607); Use Phase (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.339

6.3.64. Worker exposure: Professional Use of General surface cleaning products; Periodic cleaning by dipping (AISE-P309); Use Phase and Professional Use of Medical Devices; Medical devices ; Dipping process (AISE-P1102); Use Phase (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.339

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

7. ES 7: Widespread use by professional workers; Perfumes, Fragrances (PC 28)

7.1. Title section

ES name: *GES5 - Professional end-use of polishes and wax blends*
Product category: Perfumes, Fragrances (PC 28); PC 35: Washing and Cleaning Products (including solvent based products)

Environment	
1: *Professional end-use of polish and wax blends*	ERC 8a
Worker	
2: *Professional Use of Maintenance Products; Leather care product; Semi-Automatic process (AISE-P605); Use Phase*	PROC 2
3: *Professional Use of Maintenance Products; Leather care product; Semi-Automatic process (AISE-P605); Preparatory Phase*	PROC 8b
4: *Professional Use of Maintenance Products; Wooden Furniture care product; Manual process (AISE-P601); Use Phase*	PROC 10
5: *Professional Use of Maintenance Products - Wooden Furniture care product; Spray and wipe manual process (AISE-P602); use phase*	PROC 10
6: *Professional Use of Maintenance Products - Leather care product; Manual process (AISE-P603); use phase*	PROC 10
7: *Professional Use of Maintenance Products - Leather care product; Spray and wipe manual process (AISE-P604); use phase*	PROC 10
8: *Professional Use of Maintenance Products - Stainless steel care; Spray and wipe manual process (AISE-P609); use phase*	PROC 10
9: *Professional Use of Floor care products; Polish / impregnating agent; Manual process (AISE-P406); Use Phase*	PROC 10
10: *Professional Use of Floor care products - Polish / impregnating agent; Semi-Automatic process (AISE-P407); use phase*	PROC 10
11: *Professional Use of Floor care products - Polish / impregnating agent; Spray and wipe manual process (AISE-P408); use phase*	PROC 10
12: *Professional Use of Maintenance Products - Stainless steel care ; Manual process (AISE-P608); use phase*	PROC 10
13: *Professional Use of Maintenance Products; Wooden Furniture care product; Spray manual process (AISE-P602); Use Phase*	PROC 11
14: *Professional Use of Maintenance product; Leather care product; Wipe manual process (AISE-P604); use phase*	PROC 11
15: *Professional Use of Maintenance product; Stainless steel care product; Spray manual process (AISE-P609); use phase*	PROC 11
16: *Professional Use of Floor care products; Polish / impregnating agent; Spray manual process (AISE-P408); Use Phase*	PROC 11

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: *Professional end-use of polish and wax blends* (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

7.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 1 %
Amount used (or contained in articles), frequency and duration of use/exposure

Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Professional Use of Maintenance Products; Leather care product; Semi-Automatic process (AISE-P605); Use Phase **(PROC 2)**	Use in closed, continuous process with occasional controlled exposure
Professional Use of Maintenance Products; Leather care product; Semi-Automatic process (AISE-P605); Preparatory Phase **(PROC 8b)**	-
Professional Use of Maintenance Products; Wooden Furniture care product; Manual process (AISE-P601); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Maintenance Products - Wooden Furniture care product; Spray and wipe manual process (AISE-P602); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Maintenance Products - Leather care product; Manual process (AISE-P603); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Maintenance Products - Leather care product; Spray and wipe manual process (AISE-P604); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Maintenance Products - Stainless steel care; Spray and wipe manual process (AISE-P609); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products; Polish / impregnating agent; Manual process (AISE-P406); Use Phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*

Professional Use of Floor care products - Polish / impregnating agent; Semi-Automatic process (AISE-P407); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Floor care products - Polish / impregnating agent; Spray and wipe manual process (AISE-P408); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Maintenance Products - Stainless steel care ; Manual process (AISE-P608); use phase **(PROC 10)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Assumes small workrooms. *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
Professional Use of Maintenance Products; Wooden Furniture care product; Spray manual process (AISE-P602); Use Phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Maintenance product; Leather care product; Wipe manual process (AISE-P604); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Maintenance product; Stainless steel care product; Spray manual process (AISE-P609); use phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use
Professional Use of Floor care products; Polish / impregnating agent; Spray manual process (AISE-P408); Use Phase **(PROC 11)**	*General good housekeeping practices.* *General ventilation giving at least 3 ACH* Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Spraying with high compressed air use

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure: Professional end-use of polish and wax blends (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

7.3.2. Worker exposure: Professional Use of Maintenance Products; Leather care product; Semi-Automatic process (AISE-P605); Use Phase (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.108

7.3.3. Worker exposure: Professional Use of Maintenance Products; Leather care product; Semi-Automatic process (AISE-P605); Preparatory Phase (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.339

7.3.4. Worker exposure: Professional Use of Maintenance Products; Wooden Furniture care product; Manual process (AISE-P601); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.5. Worker exposure: Professional Use of Maintenance Products - Wooden Furniture care product; Spray and wipe manual process (AISE-P602); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.6. Worker exposure: Professional Use of Maintenance Products - Leather care product; Manual process (AISE-P603); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.7. Worker exposure: Professional Use of Maintenance Products - Leather care product; Spray and wipe manual process (AISE-P604); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.8. Worker exposure: Professional Use of Maintenance Products - Stainless steel care; Spray and wipe manual process (AISE-P609); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.572

7.3.9. Worker exposure: Professional Use of Floor care products; Polish / impregnating agent; Manual process (AISE-P406); Use Phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.10. Worker exposure: Professional Use of Floor care products - Polish / impregnating agent; Semi-Automatic process (AISE-P407); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.11. Worker exposure: Professional Use of Floor care products - Polish / impregnating agent; Spray and wipe manual process (AISE-P408); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.12. Worker exposure: Professional Use of Maintenance Products - Stainless steel care ; Manual process (AISE-P608); use phase (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.2 mg/m³ (ART 1.5)	0.264
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.572

7.3.13. Worker exposure: Professional Use of Maintenance Products; Wooden Furniture care product; Spray manual process (AISE-P602); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

7.3.14. Worker exposure: Professional Use of Maintenance product; Leather care product; Wipe manual process (AISE-P604); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

7.3.15. Worker exposure: Professional Use of Maintenance product; Stainless steel care product; Spray manual process (AISE-P609); use phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

7.3.16. Worker exposure: Professional Use of Floor care products; Polish / impregnating agent; Spray manual process (AISE-P408); Use Phase (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.071 mg/kg bw/day (TRA Workers 3.0)	0.121
Combined, systemic, long term		0.603

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

8. ES 8: Consumer use; Washing and Cleaning Products

8.1. Title section

ES name: *GES6 - Consumer end-use of washing and cleaning products*
Product category: Washing and Cleaning Products (PC 35)

Environment

1: *Wide Dispersive Use in 'Down the Drain' cleaning and maintenance products (Consumers and Professionals)*	ERC 8a
Consumer	
2: *Laundry and dish washing products; laundry regular (powder, liquid); AISE C1*	PC 35
3: *Laundry and dish washing products; laundry compact (powder, liquid/gel, tablet); AISE C2*	PC 35
4: *Laundry and dish washing products; fabric conditioners (liquid regular, liquid concentrate); AISE C3*	PC 35
5: *Laundry and dish washing products; Laundry additives (powder bleach, liquid bleach, tablet); AISE C4*	PC 35
6: *Laundry and dish washing products; Hand dishwashing (liquid regular, liquid concentrate); AISE C5*	PC 35
7: *Laundry and dish washing products; Machine dishwashing (powder, liquid, tablet); AISE C6*	PC 35
8: *Laundry and dish washing products; Laundry aids (ironing aids-starch spray, ironing aids-other); AISE C12*	PC 35
9: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Surface cleaners (liquid, powder, gel neat) ; AISE C7*	PC 35
10: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Toilet cleaners (powder, liquid, gel, tablet) ; AISE C8*	PC 35
11: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Carpet cleaners (liquid) ; AISE C11*	PC 35
12: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Wipes (bathroom, kitchen, floor) ; AISE C15*	PC 35
13: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); High pressure washers/cleaners (liquid) ; AISE C21*	PC 35
14: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Automotive care (liquid) ; AISE C22*	PC 35
15: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Surface cleaners (spray neat) ; AISE C7*	PC 35
16: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Oven cleaners (trigger spray) ; AISE C10*	PC 35
17: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Carpet cleaners (spray) ; AISE C11*	PC 35
18: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Automotive care (spray) ; AISE C22*	PC 35

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: *Wide Dispersive Use in 'Down the Drain' cleaning and maintenance products (Consumers and Professionals)* (ERC 8a)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 5.445E-4 tonnes/day
• Percentage of EU tonnage used at regional scale: = 10 % *This default value is overwritten by the below value*
• Percentage of EU tonnage used in region (CE wide-dispersive use): = 5.3 % *Price et al (2010) presented a novel approach that allows the coupling of population density and country-*

specific usage statistics for a range of home and personal care products. Spatially explicit usage estimates were generated for European Union (EU) hypothetical regions (200 × 200-km grid), as described in EU risk assessment frameworks. Recent sales and population density data were combined to assess the relevance of current default assumptions; that 10% of a product will be used in an EU hypothetical region that is inhabited by 20 million people. Five home care product categories were included in the assessment (hair, oral body and deodorant products) and usage values in a 200 × 200 km region containing 20 million people (Fprodregion), as a proportion of total EU27 product usage were derived (see Table below). In order to provide a generic refinement to ERC2 for chemicals used in home care products it is proposed to use a weighted average for all home care products used in the analysis conducted by Price et al (2010). The average per capita consumption (PCC) for each product type in the EU27 is also provided in the below Table and the weighted average Fprodregion was calculated to be 0.053 for CE uses and 0.04 for AISE uses. 0.053 is therefore used as a worst-case.

Product type	*Average PCC (mL/cap/yr)*	*$F_{prodregion}$*	*% Home care PCC*	*Weighted Contribution to $F_{prodregion}$*
Laundry Care	*8837*	*0.0385*	*59.77*	*0.0230*
Surface Care	*1749*	*0.0362*	*11.83*	*0.0043*
Toilet Care	*474*	*0.0492*	*3.21*	*0.0016*
Dish Washing	*2240*	*0.0410*	*15.15*	*0.0062*
Bleach	*1485*	*0.0511*	*10.04*	*0.0051*
Weighted average for home care products ($F_{prodregion}$) 0.04				

Price OR, Hughes GO, Mason PJ and Roche NL. 2010. Improving emission estimates of ingredients used in home and personal care products for use in EU risk assessments. Integr Environ Assess Manag. 2010 Oct;6 (4):677-84.

• Fraction of Regional tonnage used locally (AISE and CE wide-dispersive use): = 7.5E-4
Marketing surveys in combination with geostatistical analysis of population densities in Europe. Analysis of boron as conservative tracer of detergent consumption. Price OR, Hughes, GO, Roche, NL, Mason, PJ, 2010, IEAM. Fox KK, Cassani G, Facchi A, Schroder FR, Poelloth C, Holt MS. 2002., Chemosphere 47:499–505.

Conditions and measures related to treatment of waste (including article waste)

• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

Other conditions affecting environmental exposure

• Municipal STP: Yes [Effectiveness Water: 95.74%]

• Discharge rate of STP: >= 2E3 m3/d

• Application of the STP sludge on agricultural soil: Yes

• Receiving surface water flow rate: >= 1.8E4 m3/d

8.2.2. Control of consumer exposure: *Laundry and dish washing products; laundry regular (powder, liquid); AISE C1* (PC 35)

Product (article) characteristics

Covers concentrations up to 0.05 %

8.2.3. Control of consumer exposure: *Laundry and dish washing products; laundry compact (powder, liquid/gel, tablet); AISE C2* (PC 35)

Product (article) characteristics

Covers concentrations up to 0.05 %

8.2.4. Control of consumer exposure: *Laundry and dish washing products; fabric conditioners (liquid regular, liquid concentrate); AISE C3* (PC 35)

Product (article) characteristics

Covers concentrations up to 0.1 %

8.2.5. Control of consumer exposure: *Laundry and dish washing products; Laundry additives (powder bleach, liquid bleach, tablet); AISE C4* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.05 %

8.2.6. Control of consumer exposure: *Laundry and dish washing products; Hand dishwashing (liquid regular, liquid concentrate); AISE C5* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.05 %

8.2.7. Control of consumer exposure: *Laundry and dish washing products; Machine dishwashing (powder, liquid, tablet); AISE C6* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.05 %

8.2.8. Control of consumer exposure: *Laundry and dish washing products; Laundry aids (ironing aids-starch spray, ironing aids-other); AISE C12* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.025 %

8.2.9. Control of consumer exposure: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Surface cleaners (liquid, powder, gel neat) ; AISE C7* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.1 %

8.2.10. Control of consumer exposure: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Toilet cleaners (powder, liquid, gel, tablet) ; AISE C8* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.3 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

8.2.11. Control of consumer exposure: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Carpet cleaners (liquid) ; AISE C11* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.1 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

8.2.12. Control of consumer exposure: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners,*

metal cleaners); Wipes (bathroom, kitchen, floor) ; AISE C15 **(PC 35)**

Product (article) characteristics
Covers concentrations up to 0.1 %

8.2.13. Control of consumer exposure: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); High pressure washers/cleaners (liquid) ; AISE C21* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.1 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

8.2.14. Control of consumer exposure: *Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Automotive care (liquid) ; AISE C22* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

8.2.15. Control of consumer exposure: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Surface cleaners (spray neat) ; AISE C7* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.1 %

8.2.16. Control of consumer exposure: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Oven cleaners (trigger spray) ; AISE C10* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.1 %
Spraying
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Exposure duration = 4 h/event
Covers use up to 1 events per day
For each use event, covers use amounts up to 35 g/event
Information and behavioral advice for consumers
Covers use by adults.
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

8.2.17. Control of consumer exposure: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Carpet cleaners (spray) ; AISE C11* (PC 35)

Product (article) characteristics

Covers concentrations up to 0.1 %
Spraying
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Exposure duration = 4 h/event
Covers use up to 1 events per day
For each use event, covers use amounts up to 35 g/event
Information and behavioral advice for consumers
Covers use by adults.
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

8.2.18. Control of consumer exposure: *Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Automotive care (spray) ; AISE C22* (PC 35)

Product (article) characteristics
Covers concentrations up to 0.25 %
Spraying
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Exposure duration = 4 h/event
Covers use up to 1 events per day
For each use event, covers use amounts up to 35 g/event
Information and behavioral advice for consumers
Covers use by adults.
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure: Wide Dispersive Use in 'Down the Drain' cleaning and maintenance products (Consumers and Professionals) (ERC 8a)

Release	Release factor estimation method	Explanation / Justification
Water	ERC based	**Initial release factor:** 100% **Final release factor:** 100% **Local release rate:** 0.544 kg/day
Air	ERC based	**Initial release factor:** 100% **Final release factor:** 100%
Soil	ERC based	**Final release factor:** 20%

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.002 mg/L	RCR = 0.375
Sediment (freshwater)	**Local PEC:** 0.496 mg/kg dw	RCR = 0.381
Marine water	**Local PEC:** 1.868E-4 mg/L	RCR = 0.346
Sediment (marine water)	**Local PEC:** 0.046 mg/kg dw	RCR = 0.352
Sewage treatment plant	**Local PEC:** 0.012 mg/L	RCR < 0.01

Protection target	Exposure concentration	Risk characterisation
Agricultural soil	**Local PEC:** 0.112 mg/kg dw	RCR = 0.43
Man via environment - Inhalation	**Local PEC:** 2.344E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.003 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

8.3.2. Consumer exposure: Laundry and dish washing products; laundry regular (powder, liquid); AISE C1 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.038 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.3. Consumer exposure: Laundry and dish washing products; laundry compact (powder, liquid/gel, tablet); AISE C2 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.038 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.4. Consumer exposure: Laundry and dish washing products; fabric conditioners (liquid regular, liquid concentrate); AISE C3 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	4.8E-3 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.5. Consumer exposure: Laundry and dish washing products; Laundry additives (powder bleach, liquid bleach, tablet); AISE C4 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.037 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.6. Consumer exposure: Laundry and dish washing products; Hand dishwashing (liquid regular, liquid concentrate); AISE C5 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	5.2E-4 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	2.48E-6 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.7. Consumer exposure: Laundry and dish washing products; Machine dishwashing (powder, liquid, tablet); AISE C6 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	2.48E-6 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.8. Consumer exposure: Laundry and dish washing products; Laundry aids (ironing aids-starch spray, ironing aids-other); AISE C12 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.17E-3 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	8.33E-4 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

8.3.9. Consumer exposure: Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Surface cleaners (liquid, powder, gel neat) ; AISE C7 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.19E-3 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.143 mg/kg bw/day (AISE REACT)	0.032
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		0.032

8.3.10. Consumer exposure: Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Toilet cleaners (powder, liquid, gel, tablet) ; AISE C8 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.4E-3 mg/m³ (ConsExpo 5.0)	< 0.01
Dermal, systemic, long term	0.072 mg/kg bw/day (ConsExpo 5.0)	0.016
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.017

8.3.11. Consumer exposure: Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Carpet cleaners (liquid) ; AISE C11 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.41E-4 mg/m³ (ConsExpo 5.0)	< 0.01
Dermal, systemic, long term	7.8E-4 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		< 0.01

8.3.12. Consumer exposure: Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Wipes (bathroom, kitchen, floor) ; AISE C15 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.143 mg/kg bw/day (AISE REACT)	0.032
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		0.032

8.3.13. Consumer exposure: Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); High pressure washers/cleaners (liquid) ; AISE C21 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.011 mg/m³ (ConsExpo 5.0)	< 0.01
Dermal, systemic, long term	2.4E-3 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		< 0.01

8.3.14. Consumer exposure: Cleaners, liquids (all-purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Automotive care (liquid) ; AISE C22 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.11 mg/m³ (ConsExpo 5.0)	0.014
Dermal, systemic, long term	0.2 mg/kg bw/day (ConsExpo 5.0)	0.045
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.059

8.3.15. Consumer exposure: Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Surface cleaners (spray neat) ; AISE C7 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.19E-3 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.143 mg/kg bw/day (AISE REACT)	0.032
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		0.032

8.3.16. Consumer exposure: Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Oven cleaners (trigger spray) ; AISE C10 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.515 mg/m³ (TRA Consumers 3.1)	0.066
Dermal, systemic, long term	0.143 mg/kg bw/day (TRA Consumers 3.1)	0.032
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.098

8.3.17. Consumer exposure: Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Carpet cleaners (spray) ; AISE C11 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.515 mg/m³ (TRA Consumers 3.1)	0.066
Dermal, systemic, long term	0.143 mg/kg bw/day (TRA Consumers 3.1)	0.032
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.098

8.3.18. Consumer exposure: Cleaners, trigger sprays (all-purpose cleaners, sanitary products, glass cleaners); Automotive care (spray) ; AISE C22 (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.287 mg/m³ (TRA Consumers 3.1)	0.165
Dermal, systemic, long term	0.357 mg/kg bw/day (TRA Consumers 3.1)	0.08
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.246

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

9. ES 9: Consumer use; Air care products

9.1. Title section

ES name: *GES7 - Consumer end-use of air care products*
Product category: Air care products (PC 3)

Environment	
1: *Consumer end-use of air care products*	ERC 8a
Consumer	
2: *Air fresheners aerosol: aqueous, non-aqueous, concentrated (mini-aerosol, Timed*	PC 3

release aerosol) ; AISE C17	
3: *Air fresheners non aerosol: perfume in/on solid substrate (gel), diffusers (heated); AISE C18*	PC 3
4: *Air fresheners non aerosol: candles ; AISE C18*	PC 3

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: *Consumer end-use of air care products* (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

9.2.2. Control of consumer exposure: *Air fresheners aerosol: aqueous, non-aqueous, concentrated (mini-aerosol, Timed release aerosol) ; AISE C17* (PC 3)

Product (article) characteristics
Covers concentrations up to 0.25 %

9.2.3. Control of consumer exposure: *Air fresheners non aerosol: perfume in/on solid substrate (gel), diffusers (heated); AISE C18* (PC 3)

Product (article) characteristics
Covers concentrations up to 5 %

9.2.4. Control of consumer exposure: *Air fresheners non aerosol: candles ; AISE C18* (PC 3)

Product (article) characteristics
Covers concentrations up to 0.5 %

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure: Consumer end-use of air care products (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

9.3.2. Consumer exposure: Air fresheners aerosol: aqueous, non-aqueous, concentrated (mini-aerosol, Timed release aerosol) ; AISE C17 (PC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.027 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

9.3.3. Consumer exposure: Air fresheners non aerosol: perfume in/on solid substrate (gel), diffusers (heated); AISE C18 (PC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.01E-4 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

9.3.4. Consumer exposure: Air fresheners non aerosol: candles ; AISE C18 (PC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.27E-4 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

10. ES 10: Consumer use; Biocidal Products

10.1. Title section

ES name: *GES8 - Consumer end-use of biocides*
Product category: Biocidal Products (PC 8)

Environment	
1: *Consumer end-use of air care products*	ERC 8a
Consumer	
2: *Insecticides: liquid electric, spray neat ; AISE C19*	PC 8
3: *Repellents ; AISE C19*	PC 8

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: *Consumer end-use of air care products* (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

10.2.2. Control of consumer exposure: *Insecticides: liquid electric, spray neat ; AISE C19* (PC 8)

Product (article) characteristics
Covers concentrations up to 1 %

10.2.3. Control of consumer exposure: *Repellents ; AISE C19* (PC 8)

Product (article) characteristics
Covers concentrations up to 1 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: Consumer end-use of air care products (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

10.3.2. Consumer exposure: Insecticides: liquid electric, spray neat ; AISE C19 (PC 8)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.01E-4 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		< 0.01

10.3.3. Consumer exposure: Repellents ; AISE C19 (PC 8)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (ConsExpo 5.0)	< 0.01
Dermal, systemic, long term	0.14 mg/kg bw/day (ConsExpo 5.0)	0.032
Oral, systemic, long term	5.4E-3 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.033

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

11. ES 11: Consumer use; Polishes and Wax Blends

11.1. Title section

ES name: *GES9 - Consumer end-use of polishes and wax blends*
Product category: Polishes and Wax Blends (PC 31)

Environment	
1: *Consumer end-use of polishes and wax blends*	ERC 8a
Consumer	
2: *Furniture, floor & leather care (spray, liquid): wax/cream; (floor, furniture, shoes) ; AISE C20*	PC 31

3: *Furniture, floor & leather care (spray, liquid): spray; (furniture, shoes) ; AISE C20* PC 31

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: *Consumer end-use of polishes and wax blends* (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

11.2.2. Control of consumer exposure: *Furniture, floor & leather care (spray, liquid): wax/cream; (floor, furniture, shoes) ; AISE C20* (PC 31)

Product (article) characteristics
Covers concentrations up to 0.1 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

11.2.3. Control of consumer exposure: *Furniture, floor & leather care (spray, liquid): spray; (furniture, shoes) ; AISE C20* (PC 31)

Product (article) characteristics
Covers concentrations up to 0.1 %

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure: Consumer end-use of polishes and wax blends (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

11.3.2. Consumer exposure: Furniture, floor & leather care (spray, liquid): wax/cream; (floor, furniture, shoes) ; AISE C20 (PC 31)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.5E-3 mg/m³ (ConsExpo 5.0)	< 0.01
Dermal, systemic, long term	2.3E-4 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		< 0.01

11.3.3. Consumer exposure: Furniture, floor & leather care (spray, liquid): spray; (furniture, shoes) ; AISE C20 (PC 31)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.92E-3 mg/m³ (AISE REACT)	< 0.01
Dermal, systemic, long term	0.061 mg/kg bw/day (AISE REACT)	0.014
Oral, systemic, long term	0 mg/kg bw/day (AISE REACT)	< 0.01
Combined, systemic, long term		0.014

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

12. ES 12: Consumer use

12.1. Title section

ES name: *GES10 - Consumer (and Professional) end-use of cosmetics*

Environment	
1: *Consumer (and Professional) end-use of cosmetics*	ERC 8a

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: *Consumer (and Professional) end-use of cosmetics* (ERC 8a)

The environmental assessment for this use is included under ES8 - Widespread use (industrial, professional and consumer) of cleaning and maintenance products.

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure: Consumer (and Professional) end-use of cosmetics (ERC 8a)

No exposure estimations are performed in this exposure scenario, as REACH is not applicable for consumer use of cosmetics and the environmental exposure assessment is included elsewhere.

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

Not applicable.

13. ES 13: Formulation or re-packing; Various products (PC 9a, PC 18)

13.1. Title section

ES name: *Industrial manufacture of organic solvent borne, water borne and solvent-free products*
Product category: Coatings and Paints, Thinners, paint removers (PC 9a), Ink and Toners (PC 18)

Environment	
1: *Manufacture of organic solvent-borne coatings and inks*	ERC 2
2: *Manufacture of water borne liquid coatings and inks*	ERC 2
Worker	
3: *Raw material assembly and charging; raw material dispensing; pipeline from bulk storage - liquids indoor (MS0021 / MW0021)*	PROC 1
4: *Raw material assembly and charging; raw material dispensing; pipeline from bulk storage - liquids outdoor (MS0022 / MW0022)*	PROC 1
5: *Manufacturing equipment cleaning -enclosed - in workplace - in-situ (MS0051 / MW0051); Manufacturing equipment cleaning - enclosed - in workplace - off-line (MS0052 / MW0052); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - cont*	PROC 2
6: *Receipt and storage of raw materials - raw material storage - indoor (MS0014 / MW0014); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - batch - closed - sampling (MS0033 MW0033); Waste management - storage of waste prior to remo*	PROC 3
7: *Receipt and storage of raw materials - raw material delivery - packaged - solids and liquids - outdoor (MS0013 / MW0013); Receipt and storage of raw materials - raw material storage - outdoor (MS0015 / MW0015)*	PROC 3
8: *Blending/dissolving/dispersion: - mixing, milling, dispersing, completion - batch - open - sampling (MS0034 / MW0034); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - batch - open - additions (MS0035 / MW0035); Manufacturing*	PROC 5
9: *Filtering and filling - filtering or sieving and filling - non-dedicated lines - enclosed (MS0043 / MW0043); Filtering and filling - filtering or sieving and filling - non-dedicated lines - open (MS0044 / MW0044)*	PROC 8a
10: *Receipt and storage of raw materials - raw material delivery - bulk - liquids - outdoor (MS0011 / MW0011); Raw material assembly and charging - raw material dispensing - manually from bulk storage or packaged goods - liquids - outdoor (MS0026 / MW0026);*	PROC 8b
11: *Raw material assembly and charging - raw material dispensing - manually from bulk storage or packaged goods - liquids - indoor (MS0025 / MW0025); Waste management - transfer of process wastes to storage containers - in workplace - off-line (MS0070 / MW00*	PROC 8b
12: *Waste management - transfer of recovered solvent into bulk storage tanks or IBCs (MS0073 / MW0073)*	PROC 8b
13: *Filtering and filling - filtering or sieving and filling - dedicated lines - enclosed (MS0041 / MW0041); Filtering and filling - filtering or sieving and filling - dedicated lines - open (MS0042 / MW0042)*	PROC 9

13.2. Conditions of use affecting exposure

13.2.1. Control of environmental exposure: *Manufacture of organic solvent-borne coatings and i* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 22.22 tonnes/day

Total EU volume going to the market sector Coatings and inks, used in 225 days/year
• Annual use at a site: <= 5E3 tonnes/year *Total EU volume going to the market sector Coatings and inks*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (CEPE): = 225 days/year (Typical maximum site operating days, based on sector knowledge)
Technical and organisational conditions and measures
• Efficiency of raw material use: Process optimized for highly efficient use of raw materials
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

13.2.2. Control of environmental exposure: *Manufacture of water borne liquid coatings and inks* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 22.22 tonnes/day *Total EU volume going to the market sector Coatings and inks, used in 225 days/year*
• Annual use at a site: <= 5E3 tonnes/year *Total EU volume going to the market sector Coatings and inks*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (CEPE): = 225 days/year (Typical maximum site operating days, based on sector knowledge)
Technical and organisational conditions and measures
• Efficiency of raw material use: Process optimized for highly efficient use of raw materials
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

13.2.3. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure

Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Raw material assembly and charging; raw material dispensing; pipeline from bulk storage - liquids indoor (MS0021 / MW0021) **(PROC 1)**	Use in closed process, no likelihood of exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Raw material assembly and charging; raw material dispensing; pipeline from bulk storage - liquids outdoor (MS0022 / MW0022) **(PROC 1)**	Use in closed process, no likelihood of exposure Outdoor use
Manufacturing equipment cleaning -enclosed - in workplace - in-situ (MS0051 / MW0051); Manufacturing equipment cleaning - enclosed - in workplace - off-line (MS0052 / MW0052); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - cont **(PROC 2)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Receipt and storage of raw materials - raw material storage - indoor (MS0014 / MW0014); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - batch - closed - sampling (MS0033 MW0033); Waste management - storage of waste prior to remo **(PROC 3)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Receipt and storage of raw materials - raw material delivery - packaged - solids and liquids - outdoor (MS0013 / MW0013); Receipt and storage of raw materials - raw material storage - outdoor (MS0015 / MW0015) **(PROC 3)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Blending/dissolving/dispersion: - mixing, milling, dispersing, completion - batch - open - sampling (MS0034 / MW0034); Blending/dissolving/dispersion	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the

- mixing, milling, dispersing, completion - batch - open - additions (MS0035 / MW0035); Manufacturing **(PROC 5)**	hands.; For further specification, refer to section 8 of the SDS. Indoor use
Filtering and filling - filtering or sieving and filling - non-dedicated lines - enclosed (MS0043 / MW0043); Filtering and filling - filtering or sieving and filling - non-dedicated lines - open (MS0044 / MW0044) **(PROC 8a)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Receipt and storage of raw materials - raw material delivery - bulk - liquids - outdoor (MS0011 / MW0011); Raw material assembly and charging - raw material dispensing - manually from bulk storage or packaged goods - liquids - outdoor (MS0026 / MW0026); **(PROC 8b)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Raw material assembly and charging - raw material dispensing - manually from bulk storage or packaged goods - liquids - indoor (MS0025 / MW0025); Waste management - transfer of process wastes to storage containers - in workplace - off-line (MS0070 / MW00 **(PROC 8b)**	Local exhaust ventilation; Inhalation - minimum efficiency of 95 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Waste management - transfer of recovered solvent into bulk storage tanks or IBCs (MS0073 / MW0073) **(PROC 8b)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Filtering and filling - filtering or sieving and filling - dedicated lines - enclosed (MS0041 / MW0041); Filtering and filling - filtering or sieving and filling - dedicated lines - open (MS0042 / MW0042) **(PROC 9)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* *Level of contamination : handling that reduces contact between product and adjacent air* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Splash loading Indoor use *Transfer of liquid product with flow of: 10 - 100 l/minute*

13.3. Exposure estimation and reference to its source

13.3.1. Environmental release and exposure: Manufacture of organic solvent-borne coatings and i (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based CEPE (ERC2) - CEPE SPERC 2.1a.v1, 2.1b.v1 Manufacture of coatings and inks - Formulation of organic solvent-borne liquid coatings and inks - large and small scale (< and >1,000 tpa solvent use) – volatiles	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Adopted from the EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Air	SpERC based same as above	**Initial release factor:** 0.6% **Final release factor:** 0.6% **Local release rate:** 133.3 kg/day **Explanation / Justification:** CEPE expert decision based on EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Not applicable

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.002 mg/kg dw	RCR < 0.01
Man via environment - Inhalation	**Local PEC:** 0.023 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

13.3.2. Environmental release and exposure: Manufacture of water borne liquid coatings and inks (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based CEPE (ERC2) - CEPE SPERC 2.2a.v1, 2.2b.v1 Manufacture of coatings and inks - Formulation of water borne liquid coatings and inks -	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Adopted from the EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]

Release	Release factor estimation method	Explanation / Justification
	large and small scale (< and >1,000 tpa solvent use) – volatiles	
Air	SpERC based same as above	**Initial release factor:** 0.4% **Final release factor:** 0.4% **Local release rate:** 88.88 kg/day **Explanation / Justification:** CEPE expert decision based on EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Not applicable

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.001 mg/kg dw	RCR < 0.01
Man via environment - Inhalation	**Local PEC:** 0.015 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

13.3.3. Worker exposure: Raw material assembly and charging; raw material dispensing; pipeline from bulk storage - liquids indoor (MS0021 / MW0021) (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.057 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

13.3.4. Worker exposure: Raw material assembly and charging; raw material dispensing; pipeline from bulk storage - liquids outdoor (MS0022 / MW0022) (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.04 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

13.3.5. Worker exposure: Manufacturing equipment cleaning -enclosed - in workplace - in-situ (MS0051 / MW0051); Manufacturing equipment cleaning - enclosed - in workplace - off-line (MS0052 / MW0052); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - cont (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

13.3.6. Worker exposure: Receipt and storage of raw materials - raw material storage - indoor (MS0014 / MW0014); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - batch - closed - sampling (MS0033 MW0033); Waste management - storage of waste prior to remo (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

13.3.7. Worker exposure: Receipt and storage of raw materials - raw material delivery - packaged - solids and liquids - outdoor (MS0013 / MW0013); Receipt and storage of raw materials - raw material storage - outdoor (MS0015 / MW0015) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.06 mg/m³ (TRA Workers 3.0)	0.388
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.392

13.3.8. Worker exposure: Blending/dissolving/dispersion: - mixing, milling, dispersing, completion - batch - open - sampling (MS0034 / MW0034); Blending/dissolving/dispersion - mixing, milling, dispersing, completion - batch - open - additions (MS0035 / MW0035); Manufacturing (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.169

13.3.9. Worker exposure: Filtering and filling - filtering or sieving and filling - non-dedicated lines - enclosed (MS0043 / MW0043); Filtering and filling - filtering or sieving and filling - non-dedicated lines - open (MS0044 / MW0044) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.262

13.3.10. Worker exposure: Receipt and storage of raw materials - raw material delivery - bulk - liquids - outdoor (MS0011 / MW0011); Raw material assembly and charging - raw material dispensing - manually from bulk storage or packaged goods - liquids - outdoor (MS0026 / MW0026); (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.11 mg/m³ (TRA Workers 3.0)	0.647
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.724

13.3.11. Worker exposure: Raw material assembly and charging - raw material dispensing - manually from bulk storage or packaged goods - liquids - indoor (MS0025 / MW0025); Waste management - transfer of process wastes to storage containers - in workplace - off-line (MS0070 / MW00 (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.436 mg/m³ (TRA Workers 3.0)	0.046
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.123

13.3.12. Worker exposure: Waste management - transfer of recovered solvent into bulk storage tanks or IBCs (MS0073 / MW0073) (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.11 mg/m³ (TRA Workers 3.0)	0.647
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.724

13.3.13. Worker exposure: Filtering and filling - filtering or sieving and filling - dedicated lines - enclosed (MS0041 / MW0041); Filtering and filling - filtering or sieving and filling - dedicated lines - open (MS0042 / MW0042) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.4 mg/m³ (ART 1.5)	0.174
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.212

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe

use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

14. ES 14: Use at industrial sites; Various products (PC 9a, PC 18); Manufacture of other non-metallic mineral products, e.g. plasters, cement (SU 13)

14.1. Title section

ES name: *AI - Industrial application of coatings or inks*
Product category: Coatings and Paints, Thinners, paint removers (PC 9a), Ink and Toners (PC 18)
Sector of use: Manufacture of other non-metallic mineral products, e.g. plasters, cement (SU 13)

Environment	
1: *Industrial application of coatings and inks by spraying - with incineration*	ERC 4
2: *Industrial application of coatings and inks by spraying*	ERC 4
3: *Industrial coil coating*	ERC 4
4: *Industrial use of paint, coatings in metal packaging*	ERC 4
5: *Industrial use of liquid solvent-borne spray coatings in installations with wet scrubber for collection of overspray*	ERC 4
6: *Industrial use of liquid water-borne spray coatings in installations with wet scrubber for collection of overspray*	ERC 4
7: *Vehicle refinishing*	ERC 4
Worker	
8: *Preparation of material for application - enclosed - liquid products (AI0101); Loading of application equipment - enclosed - liquid coatings (AI0201)*	PROC 1
9: *Preparation of material for application - continuous - closed - liquid products (AI0103); Loading of application equipment - continuous - closed - liquid products (AI0203); Film formation - force drying (50 - 100C) (AI0502); Film formation - stoving (>100*	PROC 2
10: *Product delivery/storage - product delivery - packaged - outdoor (AI0002); Product delivery/storage - product storage - outdoor (AI0004)*	PROC 3
11: *Product delivery/storage - product storage - indoor (AI0003); Application equipment cleaning - enclosed - indoor - in-situ (AI0601 AI0607 AI0613); Application equipment cleaning - enclosed - indoor - off-line (AI0602 / AI0608 / AI0614)*	PROC 3
12: *Waste management - storage of waste prior to removal for off-site management (AI1001)*	PROC 3
13: *Film formation - airdrying (AI0501)*	PROC 4
14: *Preparation of material for application - batch - indoor - liquid products (AI0105); Application equipment cleaning - open - indoor - in-situ (AI0603 / AI0609 / AI0615); Application equipment cleaning - open - indoor - off-line (AI0605 / AI0611 / AI0616)*	PROC 5
15: *Preparation of material for application - batch - outdoor - liquid products - powder products (AI0107); Application equipment cleaning - open - outdoor - in-situ (AI0604 / AI0610); Application equipment cleaning - open - outdoor - off-line (AI0606 / AI06*	PROC 5
16: *Application - on-line - manual spraying - open equipment - liquid coatings (AI0306); Application - off-line - manual spraying - open equipment - liquid products (AI0307)*	PROC 7
17: *Application - on-line - automatic/robotic spray coating or printing - enclosed equipment - liquid coatings - printing inks (AI0304)*	PROC 7
18: *Application - aerosol dispensers (AI0312)*	PROC 7
19: *Loading of application equipment - batch - outdoor - liquid products (AI0207)*	PROC 8a
20: *Product delivery/storage - product delivery - bulk - outdoor (AI0001);*	PROC 8b
21: *Preparation of material for application - transfer of material from one container to another - liquid coatings (AI0108); Loading of application equipment - batch - indoor -*	PROC 8b

liquid products (AI0205); Loading of application equipment - transfer of material	
22: *Application - on-line - roller, spreader, flow coating or printing - enclosed equipment - large scale - liquid coatings - printing inks [e.g. publication gravure] (AI0302); Application - on-line - roller, spreader, flow coating or printing - open equipm*	PROC 10
23: *Application - on-line - dipping - liquid coatings (AI0309); Application - fluidised-bed - manual - or - open (AI0311); Application - fluidised-bed - automatic - or - enclosed (AI0310)*	PROC 13

14.2. Conditions of use affecting exposure

14.2.1. Control of environmental exposure: *Industrial application of coatings and inks by spraying - with incineration* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.063 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 14.23 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 225 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (CEPE): = 225 d/y (Industry knowledge)
Technical and organisational conditions and measures
• Indoor/outdoor use: Indoor Use
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• Type of product use and relevant emission routes: Industrial product use leading to emissions to air
• Type of product use and relevant emission routes: Industrial product use leading to disposal via wastewater

14.2.2. Control of environmental exposure: *Industrial application of coatings and inks by spraying* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.063 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 14.19 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 225 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (CEPE): = 225 d/y (Industry knowledge)
Technical and organisational conditions and measures
• Indoor/outdoor use: Indoor Use

Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• Type of product use and relevant emission routes: Industrial product use leading to emissions to air
• Type of product use and relevant emission routes: Industrial product use leading to disposal via wastewater

14.2.3. Control of environmental exposure: *Industrial coil coating* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 1.98 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year)*
• Annual use at a site: <= 435 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

14.2.4. Control of environmental exposure: *Industrial use of paint, coatings in metal packaging* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.236 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year)*
• Annual use at a site: <= 52 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]

• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

14.2.5. Control of environmental exposure: *Industrial use of liquid solvent-borne spray coatings in installations with wet scrubber for collection of overspray* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.167 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 300 use days/year)*
• Annual use at a site: <= 50 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (ACEA): = 300 days/year (Continuous withdrawal)
Technical and organisational conditions and measures
• Operational Conditions for ACEA (ERC 4): Operational Conditions for ACEA SpERCs (ERC 4) *Applies for solvents and other volatile organic compounds which do not become part of coated objects; release to air in compliance with directive 2010/75/EC and its national transpositions – no applicable standard phrases. Large installations may use up to 1,000 kg/d of volatile compounds with aquatic toxicity (e.g. aromatic hydrocarbons, terpenes, high-boiling alcohols) in application of coatings. Overspray may be collected by a wet scrubber (Venturi or similar, actually wet scrubbers are more and more replaced by dry systems for collection of overspray). Volatile compounds are only retained at low levels in circulating water, as huge air volumes and water movement lead to a relatively low equilibrium stage, far below theoretical dissolution levels of solvents (typically < 0.1 % for solvent-borne coatings, < 0.5 % for water-borne coatings, measured as COD < 2,000 mg/l resp. < 10,000 mg/l). Circulating water is continuously separated from paint sludge but has to be replaced typically once per year due to increase of salt content and activity of microorganisms. Finally, dissolved solvents are transferred into a process waste water stream for further treatment on-site or off-site. Only few installations provide biological treatment for the dissolved organic content in waste water. In order to avoid overload of biological treatment plants, exchanged water from wet scrubbers is typically transferred into a buffer tank from which it can be released at appropriate amounts (e.g. 10 m³/d) for a longer period (between 3 and 100 days).*
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

14.2.6. Control of environmental exposure: *Industrial use of liquid water-*

borne spray coatings in installations with wet scrubber for collection of overspray (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.025 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 7.581 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 300 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year (ACEA): = 300 days/year (Continuous withdrawal)
Technical and organisational conditions and measures
• Operational Conditions for ACEA (ERC 4): Operational Conditions for ACEA SpERCs (ERC 4) *Applies for solvents and other volatile organic compounds which do not become part of coated objects; release to air in compliance with directive 2010/75/EC and its national transpositions – no applicable standard phrases. Large installations may use up to 1,000 kg/d of volatile compounds with aquatic toxicity (e.g. aromatic hydrocarbons, terpenes, high-boiling alcohols) in application of coatings. Overspray may be collected by a wet scrubber (Venturi or similar, actually wet scrubbers are more and more replaced by dry systems for collection of overspray). Volatile compounds are only retained at low levels in circulating water, as huge air volumes and water movement lead to a relatively low equilibrium stage, far below theoretical dissolution levels of solvents (typically < 0.1 % for solvent-borne coatings, < 0.5 % for water-borne coatings, measured as COD < 2,000 mg/l resp. < 10,000 mg/l). Circulating water is continuously separated from paint sludge but has to be replaced typically once per year due to increase of salt content and activity of microorganisms. Finally, dissolved solvents are transferred into a process waste water stream for further treatment on-site or off-site. Only few installations provide biological treatment for the dissolved organic content in waste water. In order to avoid overload of biological treatment plants, exchanged water from wet scrubbers is typically transferred into a buffer tank from which it can be released at appropriate amounts (e.g. 10 m³/d) for a longer period (between 3 and 100 days).*
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

14.2.7. Control of environmental exposure: *Vehicle refinishing* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.042 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Annual use at a site: <= 10.52 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 250 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 250 days/year (Industry knowledge)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]

• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

14.2.8. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Preparation of material for application - enclosed - liquid products (AI0101); Loading of application equipment - enclosed - liquid coatings (AI0201) **(PROC 1)**	Use in closed process, no likelihood of exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Preparation of material for application - continuous - closed - liquid products (AI0103); Loading of application equipment - continuous - closed - liquid products (AI0203); Film formation - force drying (50 - 100C) (AI0502); Film formation - stoving (>100 **(PROC 2)**	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Product delivery/storage - product delivery - packaged - outdoor (AI0002); Product delivery/storage - product storage - outdoor (AI0004) **(PROC 3)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Product delivery/storage - product storage - indoor (AI0003); Application	Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to

equipment cleaning - enclosed - indoor - in-situ (AI0601 AI0607 AI0613); Application equipment cleaning - enclosed - indoor - off-line (AI0602 / AI0608 / AI0614) **(PROC 3)**	other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Waste management - storage of waste prior to removal for off-site management (AI1001) **(PROC 3)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Film formation - airdrying (AI0501) **(PROC 4)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Preparation of material for application - batch - indoor - liquid products (AI0105); Application equipment cleaning - open - indoor - in-situ (AI0603 / AI0609 / AI0615); Application equipment cleaning - open - indoor - off-line (AI0605 / AI0611 / AI0616) **(PROC 5)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use
Preparation of material for application - batch - outdoor - liquid products - powder products (AI0107); Application equipment cleaning - open - outdoor - in-situ (AI0604 / AI0610); Application equipment cleaning - open - outdoor - off-line (AI0606 / AI06 **(PROC 5)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Application - on-line - manual spraying - open equipment - liquid coatings (AI0306); Application - off-line - manual spraying - open equipment - liquid products (AI0307) **(PROC 7)**	*Use in cross-flow spray room* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Wear a respirator providing a minimum efficiency of 97.5 % Indoor use Ensure that direction of application is only horizontal or downward. Surface spraying of liquids Surface spraying with no or low compressed air use
Application - on-line - automatic/robotic spray coating or printing - enclosed	Carry out in a vented booth provided with laminar airflow. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure

equipment - liquid coatings - printing inks (AI0304) **(PROC 7)**	*Ensure medium level containment* Complete segregation without ventilation *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
Application - aerosol dispensers (AI0312) **(PROC 7)**	Ensure movable capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use Ensure that direction of application is only horizontal or downward. Very low application rate (< 0.03 l/minute) *Activities with treated/contaminated objects (surface 0.1 - 0.3 m²)* Surface spraying of liquids Surface spraying with no or low compressed air use *Contamination 10-90 % of surface*
Loading of application equipment - batch - outdoor - liquid products (AI0207) **(PROC 8a)**	*Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Splash loading Outdoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
Product delivery/storage - product delivery - bulk - outdoor (AI0001); **(PROC 8b)**	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Outdoor use
Preparation of material for application - transfer of material from one container to another - liquid coatings (AI0108); Loading of application equipment - batch - indoor - liquid products (AI0205); Loading of application equipment - transfer of material **(PROC**	Local exhaust ventilation; Inhalation - minimum efficiency of 95 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use

8b)	
***Application - on-line - roller, spreader, flow coating or printing - enclosed equipment - large scale - liquid coatings - printing inks [e.g. publication gravure] (AI0302); Application - on-line - roller, spreader, flow coating or printing - open equipm* (PROC 10)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Wear a respirator providing a minimum efficiency of 90 % Indoor use *Spreading of liquids at surfaces or work pieces > 3 m² / hour*
***Application - on-line - dipping - liquid coatings (AI0309); Application - fluidised-bed - manual - or - open (AI0311); Application - fluidised-bed - automatic - or - enclosed (AI0310)* (PROC 13)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS. Indoor use

14.3. Exposure estimation and reference to its source

14.3.1. Environmental release and exposure: Industrial application of coatings and inks by spraying - with incineration (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based CEPE (ERC4) - CEPE SPERC 4.1a.v1 Industrial application of coatings and inks by spraying - Industrial application of coatings and inks by spraying - with incineration - volatiles	**Initial release factor:** 2% **Final release factor:** 2% **Local release rate:** 1.265 kg/day **Explanation / Justification:** A proportion of the liquid phase will be present in spray booth scrubber water.
Air	SpERC based same as above	**Initial release factor:** 0.8% **Final release factor:** 0.8% **Local release rate:** 0.506 kg/day **Explanation / Justification:** For a coating film to form, the volatile phase of organic solvent borne and water borne coatings must evaporate into the atmosphere. 80% solvent inputs emitted through Incinerator with efficiency 99% No OECD Coatings ESD data – industry data.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** There is no deposition to soil from these application processes.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.398E-4 mg/L	RCR = 0.629

Protection target	Exposure concentration	Risk characterisation
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.644E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

14.3.2. Environmental release and exposure: Industrial application of coatings and inks by spraying (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based CEPE (ERC4) - CEPE SPERC 4.1b.v1 Industrial application of coatings and inks by spraying - Industrial application of coatings and inks by spraying - volatiles	**Initial release factor:** 2% **Final release factor:** 2% **Local release rate:** 1.261 kg/day **Explanation / Justification:** A proportion of the liquid phase will be present in spray booth scrubber water.
Air	SpERC based same as above	**Initial release factor:** 98% **Final release factor:** 98% **Local release rate:** 61.79 kg/day **Explanation / Justification:** For a coating film to form, the volatile phase of organic solvent borne and water borne coatings must evaporate into the atmosphere. OECD Coatings ESD
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** There is no deposition to soil from these application processes.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.656
Sediment (freshwater)	**Local PEC:** 0.868 mg/kg dw	RCR = 0.668
Marine water	**Local PEC:** 3.388E-4 mg/L	RCR = 0.628
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.638
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.011 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

14.3.3. Environmental release and exposure: Industrial coil coating (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based ECCA SPERC 5.1b.v1 - ECCA SPERC 5.1b.v1 Industrial Coil Coating - Volatiles - Industrial Coil Coating - Volatiles	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Air	SpERC based same as above	**Initial release factor:** 12% **Final release factor:** 12% **Local release rate:** 237.6 kg/day **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.04 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

14.3.4. Environmental release and exposure: Industrial use of paint, coatings in metal packaging (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based EMPAC SPERC 5.2.v1 - EMPAC SPERC 5.2.v1 Industrial Use of Paint, Coatings in metal packaging - Solvents - Industrial Use of Paint, Coatings in metal packaging - Solvents	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Air	SpERC based same as above	**Initial release factor:** 100% **Final release factor:** 100% **Local release rate:** 236 kg/day **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.04 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR ≤ 0.005

14.3.5. Environmental release and exposure: Industrial use of liquid solvent-borne spray coatings in installations with wet scrubber for collection of overspray (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based ACEA (ERC 4) - ACEA SPERC 4.1.a.v4 Industrial use of liquid spray coatings in installations with wet scrubber for collection of overspray - Application of liquid solvent-borne spray coatings, volatile lead substance with water solubility > 10 mg/l	**Initial release factor:** 0.5% **Final release factor:** 0.5% **Local release rate:** 0.835 kg/day **Explanation / Justification:** A minor amount of volatile compounds remains in the paint sludge and in the circulating water of the wet scrubber. The content in the water of the wet scrubber depends on a dynamic equilibrium (< 0.1 % for solvent-borne coatings, < 0.5 % for water-borne coatings). Typical solvents for water-borne coatings (alcohols, glycol ethers) have higher water solubility than typical solvents for solvent-borne coatings. Due the different solvent content of coatings, the total transfer rates amount to < 0.5 % for solvent-borne coatings and < 5 % for water-borne coatings. The water volume of the wet scrubber is regularly exchanged at rates between twice per year and once every three years. Exchanged volumes are transferred to a buffer tank and released from there to waste-water treatment plants at typical rates of 10 m³/d. This results in a peak emission for a few days (typically ten-fold for one tenth of all operating days)
Air	SpERC based same as above	**Initial release factor:** 92.5% **Final release factor:** 92.5% **Local release rate:** 154.5 kg/day **Explanation / Justification:** Volatile compounds are released to air in spray-booths, flash-off zone and drying ovens. Final release to air is depending on required abatement to comply with directive 2010/75/EC (ovens are often connected to abatement which reduces release to air by 5 to 25 for solvent-borne coatings and by 10 to 50 % for water-borne coatings; abatement for spray-booths is only typical for solvent-borne basecoats). Non-volatile compounds are captured in the wet scrubber. Residual emission is typically below 3 mg/m³. 15 kg/h of paint atomized in a spray-booth with 50,000 m³/h exhaust air volume result in 150 g/h residual emission (i.e. 1 %). Figures for release to air are worst case figures assuming that volatile compound are not abated. In practice, installations are run in compliance with directive 2010/75/EU and its national transpositions which results in lower release rates.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Paint sludge and filter sludge is hazardous waste which needs to be incinerated resp. recovered energetically. Inert residues are not used for agricultural purposes.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.003 mg/L	RCR = 0.489
Sediment (freshwater)	**Local PEC:** 0.647 mg/kg dw	RCR = 0.497
Marine water	**Local PEC:** 2.484E-4 mg/L	RCR = 0.46
Sediment (marine water)	**Local PEC:** 0.061 mg/kg dw	RCR = 0.468
Sewage treatment plant	**Local PEC:** 0.018 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.175 mg/kg dw	RCR = 0.672
Man via environment - Inhalation	**Local PEC:** 0.035 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005

Protection target	Exposure concentration	Risk characterisation
Man via environment - combined routes		RCR ≤ 0.005

14.3.6. Environmental release and exposure: Industrial use of liquid water-borne spray coatings in installations with wet scrubber for collection of overspray (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based ACEA (ERC 4) - ACEA SPERC 4.1.c.v4 Industrial use of liquid spray coatings in installations with wet scrubber for collection of overspray - Application of liquid water-borne spray coatings, volatile lead substance with water solubility > 10 mg/l	**Initial release factor:** 5% **Final release factor:** 5% **Local release rate:** 1.264 kg/day **Explanation / Justification:** A minor amount of volatile compounds remains in the paint sludge and in the circulating water of the wet scrubber. The content in the water of the wet scrubber depends on a dynamic equilibrium (< 0.1 % for solvent-borne coatings, < 0.5 % for water-borne coatings). Typical solvents for water-borne coatings (alcohols, glycol ethers) have higher water solubility than typical solvents for solvent-borne coatings. Due the different solvent content of coatings, the total transfer rates amount to < 0.5 % for solvent-borne coatings and < 5 % for water-borne coatings. The water volume of the wet scrubber is regularly exchanged at rates between twice per year and once every three years. Exchanged volumes are transferred to a buffer tank and released from there to waste-water treatment plants at typical rates of 10 m³/d. This results in a peak emission for a few days (typically ten-fold for one tenth of all operating days)
Air	SpERC based same as above	**Initial release factor:** 90% **Final release factor:** 90% **Local release rate:** 22.74 kg/day **Explanation / Justification:** Volatile compounds are released to air in spray-booths, flash-off zone and drying ovens. Final release to air is depending on required abatement to comply with directive 2010/75/EC (ovens are often connected to abatement which reduces release to air by 5 to 25 for solvent-borne coatings and by 10 to 50 % for water-borne coatings; abatement for spray-booths is only typical for solvent-borne basecoats). Non-volatile compounds are captured in the wet scrubber. Residual emission is typically below 3 mg/m³. 15 kg/h of paint atomized in a spray-booth with 50,000 m³/h exhaust air volume result in 150 g/h residual emission (i.e. 1 %). Figures for release to air are worst case figures assuming that volatile compound are not abated. In practice, installations are run in compliance with directive 2010/75/EU and its national transpositions which results in lower release rates.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Paint sludge and filter sludge is hazardous waste which needs to be incinerated resp. recovered energetically. Inert residues are not used for agricultural purposes.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.657
Sediment (freshwater)	**Local PEC:** 0.869 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.394E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.639

Protection target	Exposure concentration	Risk characterisation
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.005 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

14.3.7. Environmental release and exposure: Vehicle refinishing (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based BFL/ZKF SPERC 5.3b.v1 - BFL/ZKF SPERC 5.3b.v1 Vehicle Refinishing - Volatiles/Solvents - Vehicle Refinishing - Volatiles/Solvents	**Initial release factor:** 3% **Final release factor:** 3% **Local release rate:** 1.262 kg/day **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Air	SpERC based same as above	**Initial release factor:** 96.8% **Final release factor:** 96.8% **Local release rate:** 40.73 kg/day **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Data from OECD ESD for coatings manufacture and application; industry updating of OECD data; industry-derived data EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES), OECD, July 2009 [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=ENV/JM/MONO(2009)24&doclanguage=en]

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.657
Sediment (freshwater)	**Local PEC:** 0.869 mg/kg dw	RCR = 0.668
Marine water	**Local PEC:** 3.391E-4 mg/L	RCR = 0.628
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.639

Protection target	Exposure concentration	Risk characterisation
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.008 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.005 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

14.3.8. Worker exposure: Preparation of material for application - enclosed - liquid products (AI0101); Loading of application equipment - enclosed - liquid coatings (AI0201) (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.057 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

14.3.9. Worker exposure: Preparation of material for application - continuous - closed - liquid products (AI0103); Loading of application equipment - continuous - closed - liquid products (AI0203); Film formation - force drying (50 - 100C) (AI0502); Film formation - stoving (>100 (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

14.3.10. Worker exposure: Product delivery/storage - product delivery - packaged - outdoor (AI0002); Product delivery/storage - product storage - outdoor (AI0004) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.06 mg/m³ (TRA Workers 3.0)	0.388
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.392

14.3.11. Worker exposure: Product delivery/storage - product storage - indoor (AI0003); Application equipment cleaning - enclosed - indoor - in-situ (AI0601 AI0607 AI0613); Application equipment cleaning - enclosed - indoor - off-line (AI0602 / AI0608 / AI0614) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

14.3.12. Worker exposure: Waste management - storage of waste prior to removal for off-site management (AI1001) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.06 mg/m³ (TRA Workers 3.0)	0.388
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.392

14.3.13. Worker exposure: Film formation - airdrying (AI0501) (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.131

14.3.14. Worker exposure: Preparation of material for application - batch - indoor - liquid products (AI0105); Application equipment cleaning - open - indoor - in-situ (AI0603 / AI0609 / AI0615); Application equipment cleaning - open - indoor - off-line (AI0605 / AI0611 / AI0616) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.169

14.3.15. Worker exposure: Preparation of material for application - batch - outdoor - liquid products - powder products (AI0107); Application equipment cleaning - open - outdoor - in-situ (AI0604 / AI0610); Application equipment cleaning - open - outdoor - off-line (AI0606 / AI06 (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.11 mg/m³ (TRA Workers 3.0)	0.647
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.724

14.3.16. Worker exposure: Application - on-line - manual spraying - open equipment - liquid coatings (AI0306); Application - off-line - manual spraying - open equipment - liquid products (AI0307) (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18.75 mg/m³ (ART 1.5)	0.603
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.844

14.3.17. Worker exposure: Application - on-line - automatic/robotic spray coating or printing - enclosed equipment - liquid coatings - printing inks (AI0304) (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.2 mg/m³ (ART 1.5)	0.039
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.28

14.3.18. Worker exposure: Application - aerosol dispensers (AI0312) (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.82

14.3.19. Worker exposure: Loading of application equipment - batch - outdoor - liquid products (AI0207) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.527

14.3.20. Worker exposure: Product delivery/storage - product delivery - bulk - outdoor (AI0001); (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.11 mg/m³ (TRA Workers 3.0)	0.647
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.724

14.3.21. Worker exposure: Preparation of material for application - transfer of material from one container to another - liquid coatings (AI0108); Loading of application equipment - batch - indoor - liquid products (AI0205); Loading of application equipment - transfer of material (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.436 mg/m³ (TRA Workers 3.0)	0.046
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.123

14.3.22. Worker exposure: Application - on-line - roller, spreader, flow coating or printing - enclosed equipment - large scale - liquid coatings - printing inks [e.g. publication gravure] (AI0302); Application - on-line - roller, spreader, flow coating or printing - open equipm (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.347

14.3.23. Worker exposure: Application - on-line - dipping - liquid coatings (AI0309); Application - fluidised-bed - manual - or - open (AI0311); Application - fluidised-bed - automatic - or - enclosed (AI0310) (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.262

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

15. ES 15: Widespread use by professional workers; Various products (PC 9a, PC 18); Manufacture of other non-metallic mineral products, e.g. plasters, cement (SU 13)

15.1. Title section

ES name: *AP - Professional application of coatings or inks*
Product category: Coatings and Paints, Thinners, paint removers (PC 9a), Ink and Toners (PC 18)
Sector of use: Manufacture of other non-metallic mineral products, e.g. plasters, cement (SU 13)

Environment	
1: *Professional application of coatings and inks - brushing/rolling (indoor and outdoor)*	ERC 8d, ERC 8a
2: *Professional application of coatings and inks - spraying (indoor and outdoor)*	ERC 8d, ERC 8a
Worker	
3: *Loading of application equipment - closed - continuous (AP0302); Film formation - force drying (50 - 100C) (AP0504 AP0505); Film formation - stoving (>100°C) (AP0506 AP0507); Film formation - UV/EB radiation curing (AP0701)*	PROC 2
4: *Product delivery/storage - packaged - outdoor (AP0102); Product delivery/storage - product storage - outdoor (AP0104)*	PROC 3
5: *Product delivery/storage - product storage - indoor (AP0103); Preparation of material for application - closed - continuous (AP0201)*	PROC 3
6: *Waste management - storage of waste prior to removal for off-site management (AP1201)*	PROC 3
7: *Film formation - airdrying - indoor (AP0502)*	PROC 4
8: *Film formation - airdrying - outdoor (AP0503)*	PROC 4
9: *Preparation of material for application - batch - outdoor (AP0203); Loading of application equipment - batch - outdoor (AP0304); Application equipment cleaning - open - in situ - outdoor (AP0703); Application equipment cleaning - open - off-line - outdoor*	PROC 5
10: *Preparation of material for application - batch - indoor (AP0202); Loading of application equipment - batch - indoor (AP0303); Laboratory use - QC laboratory (AP1101); Application equipment cleaning - open - in situ - indoor (AP0702); Application equipmen*	PROC 5
11: *Product delivery/storage - bulk - outdoor (AP0101); Preparation of material for application - transfer of material from one container to another - outdoor (AP0205); Loading of application equipment - transfer of material from one container to another - ou*	PROC 8a
12: *Preparation of material for application - transfer of material from one container to another - indoor (AP0204); Loading of application equipment - transfer of material from one container to another - indoor (AP0305); Waste management - transfer of process*	PROC 8a
13: *Application - manual - brush, roller, spreader - coatings - outdoor (AP0404)*	PROC 10
14: *Application - manual - brush, roller, spreader - coatings - indoor (AP0405); Application - on-line - roller, spreader, flow - printing inks - indoor (AP0406)*	PROC 10
15: *Application - manual spraying - coatings - outdoor (AP0402)*	PROC 11
16: *Application - manual spraying - coatings - indoor (AP0403)*	PROC 11
17: *Application - aerosol dispensers (AP0501)*	PROC 11
18: *Application - hand - paints, pastels, pigment powders - indoor (AP0407)*	PROC 19

15.2. Conditions of use affecting exposure

15.2.1. Control of environmental exposure: *Professional application of coatings and inks - brushing/rolling (indoor and outdoor)*

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 0.004 tonnes/day
• Percentage of EU tonnage used at regional scale: = 10 %
• Emission days per year (CEPE): = 225 d/y (Industry knowledge)
Technical and organisational conditions and measures
• Indoor/outdoor use: Covers Indoor and Outdoor Use
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• Type of product use and relevant emission routes: Professional product use leading to emissions to air
• Type of product use and relevant emission routes: Professional product use leading to disposal via wastewater
• Type of product use and relevant emission routes: Professional product use with limited or no technical control of emission

15.2.2. Control of environmental exposure: *Professional application of coatings and inks - spraying (indoor and outdoor)*

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 0.004 tonnes/day *Daily wide-dispersive use after correction for emission days (225 days/year instead of default 365 days/year)*
• Percentage of EU tonnage used at regional scale: = 10 %
• Emission days per year (CEPE): = 225 d/y (Industry knowledge)
Technical and organisational conditions and measures
• Indoor/outdoor use: Covers Indoor and Outdoor Use
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• Type of product use and relevant emission routes: Professional product use leading to emissions to air
• Type of product use and relevant emission routes: Professional product use leading to disposal via wastewater
• Type of product use and relevant emission routes: Professional product use with limited or no technical

control of emission

15.2.3. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Loading of application equipment - closed - continuous (AP0302); Film formation - force drying (50 - 100C) (AP0504 AP0505); Film formation - stoving (>100°C) (AP0506 AP0507); Film formation - UV/EB radiation curing (AP0701) **(PROC 2)**	Covers concentrations up to 100 % Covers use up to 8 h/day Local exhaust ventilation; Inhalation - minimum efficiency of 80 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Assumes process temperature up to 40 °C Indoor use
Product delivery/storage - packaged - outdoor (AP0102); Product delivery/storage - product storage - outdoor (AP0104) **(PROC 3)**	Covers concentrations up to 100 % Covers use up to 8 h/day Assumes process temperature up to 40 °C Outdoor use
Product delivery/storage - product storage - indoor (AP0103); Preparation of material for application - closed - continuous (AP0201) **(PROC 3)**	Covers concentrations up to 100 % Covers use up to 8 h/day Provide a basic standard of general ventilation (1 to 3 air changes per hour). Assumes process temperature up to 40 °C Indoor use
Waste management - storage of waste prior to removal for off-site management (AP1201) **(PROC 3)**	Covers concentrations up to 100 % Covers use up to 8 h/day Assumes process temperature up to 40 °C Outdoor use
Film formation - airdrying - indoor (AP0502) **(PROC 4)**	Covers concentrations up to 100 % Covers use up to 8 h/day Local exhaust ventilation; Inhalation - minimum efficiency of 80 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Assumes process temperature up to 40 °C Indoor use
Film formation - airdrying - outdoor (AP0503) **(PROC 4)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* Assumes process temperature up to 40 °C Outdoor use *Activities with agitated surface* *Surface 1 - 3 m²*

Preparation of material for application - batch - outdoor (AP0203); Loading of application equipment - batch - outdoor (AP0304); Application equipment cleaning - open - in situ - outdoor (AP0703); Application equipment cleaning - open - off-line - outdoor **(PROC 5)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* Assumes process temperature up to 40 °C Outdoor use *Activities with agitated surface* *Surface 1 - 3 m²*
Preparation of material for application - batch - indoor (AP0202); Loading of application equipment - batch - indoor (AP0303); Laboratory use - QC laboratory (AP1101); Application equipment cleaning - open - in situ - indoor (AP0702); Application equipmen **(PROC 5)**	Covers concentrations up to 100 % Covers use up to 8 h/day Local exhaust ventilation; Inhalation - minimum efficiency of 80 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Assumes process temperature up to 40 °C Indoor use
Product delivery/storage - bulk - outdoor (AP0101); Preparation of material for application - transfer of material from one container to another - outdoor (AP0205); Loading of application equipment - transfer of material from one container to another - ou **(PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* *General good housekeeping practices.* Splash loading Assumes process temperature up to 40 °C Outdoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
Preparation of material for application - transfer of material from one container to another - indoor (AP0204); Loading of application equipment - transfer of material from one container to another - indoor (AP0305); Waste management - transfer of process **(PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General good housekeeping practices.* Local exhaust ventilation; Inhalation - minimum efficiency of 80 % *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Splash loading Assumes process temperature up to 40 °C Indoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
Application - manual - brush, roller, spreader - coatings - outdoor (AP0404) **(PROC 10)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* *General good housekeeping practices.* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Outdoor use *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
Application - manual - brush, roller, spreader - coatings - indoor (AP0405); Application - on-line - roller, spreader, flow - printing inks - indoor (AP0406) **(PROC 10)**	Limit the substance content in the mixture to 50 % . *General good housekeeping practices.* Ensure fixed capturing hood is used. *General ventilation giving at least 3 ACH* *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* Application rate = 0.07 L/min
Application - manual spraying - coatings - outdoor (AP0402)	*General good housekeeping practices.* *Covers sources not located close to buildings*

(PROC 11)	Wear a respirator providing a minimum efficiency of 90 % Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only horizontal or downward.
Application - manual spraying - coatings - indoor (AP0403) **(PROC 11)**	Covers concentrations up to 100 % Covers use up to 8 h/day Ensure fixed capturing hood is used. *General good housekeeping practices.* Local exhaust ventilation; Inhalation - minimum efficiency of 80 % *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use Ensure that direction of application is only horizontal or downward. Low application rate (0.03 - 0.3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
Application - aerosol dispensers (AP0501) **(PROC 11)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General good housekeeping practices.* Local exhaust ventilation; Inhalation - minimum efficiency of 80 % *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use *Level of contamination 10-90% of surface* Ensure that direction of application is only horizontal or downward. Very low application rate (< 0.03 l/minute) *Activities with treated/contaminated objects (surface 0.1 - 0.3 m²)* Surface spraying of liquids Surface spraying with no or low compressed air use
Application - hand - paints, pastels, pigment powders - indoor (AP0407) **(PROC 19)**	*Limit the substance content in the product to 90%* *Manual task* Ensure fixed capturing hood is used. *General good housekeeping practices.* *General ventilation giving at least 3 ACH* Application rate = 25 L/min *Surface 1 - 3 m²* *Assuming more than rare contact with skin* *Activities with agitated surfaces* *More than light skin contact assumed* *Use leads to aerosol formation*

15.3. Exposure estimation and reference to its source

15.3.1. Environmental release and exposure: Professional application of coatings and inks - brushing/rolling (indoor and outdoor)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based CEPE (ERC8d professional) -	**Initial release factor:** 1% **Final release factor:** 1% **Local release rate:** 0.044 kg/day

Release	Release factor estimation method	Explanation / Justification
	CEPE SPERC 8d.2a.v1 Professional application of coatings and inks - Professional application of coatings and inks by brush or roller - outdoor - volatiles	**Explanation / Justification:** There can be losses to sewers from application equipment clean-up. No OECD – industry data
Air	SpERC based same as above	**Initial release factor:** 98.5% **Final release factor:** 98.5% **Explanation / Justification:** For a coating film to form, the volatile phase of organic solvent borne and water borne coatings must evaporate into the atmosphere. OECD ESD
Soil	SpERC based same as above	**Final release factor:** 0.5% **Explanation / Justification:** During application of coatings outdoors, a proportion of the applied coating may be deposited on the soil below the area being painted. No OECD – industry data

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 9.627E-4 mg/L	RCR = 0.178
Sediment (freshwater)	**Local PEC:** 0.236 mg/kg dw	RCR = 0.181
Marine water	**Local PEC:** 8.068E-5 mg/L	RCR = 0.149
Sediment (marine water)	**Local PEC:** 0.02 mg/kg dw	RCR = 0.152
Sewage treatment plant	**Local PEC:** 9.456E-4 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.009 mg/kg dw	RCR = 0.035
Man via environment - Inhalation	**Local PEC:** 1.708E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

15.3.2. Environmental release and exposure: Professional application of coatings and inks - spraying (indoor and outdoor)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based CEPE (ERC8d professional) - CEPE SPERC 8d.3a.v1 Professional application of coatings and inks - Professional application of coatings and inks by spraying - outdoor - volatiles	**Initial release factor:** 2% **Final release factor:** 2% **Local release rate:** 0.089 kg/day **Explanation / Justification:** During application of coatings outdoors, a proportion of the applied coating can be deposited into water No OECD – industry data
Air	SpERC based same as above	**Initial release factor:** 98% **Final release factor:** 98% **Explanation / Justification:** For a coating film to form, the volatile phase of organic solvent borne and water borne coatings must evaporate into the atmosphere.

Release	Release factor estimation method	Explanation / Justification
		OECD ESD
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** There is no deposition to soil from these application processes. OECD ESD

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.001 mg/L	RCR = 0.196
Sediment (freshwater)	**Local PEC:** 0.259 mg/kg dw	RCR = 0.199
Marine water	**Local PEC:** 9.01E-5 mg/L	RCR = 0.167
Sediment (marine water)	**Local PEC:** 0.022 mg/kg dw	RCR = 0.17
Sewage treatment plant	**Local PEC:** 0.002 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.018 mg/kg dw	RCR = 0.07
Man via environment - Inhalation	**Local PEC:** 1.764E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

15.3.3. Worker exposure: Loading of application equipment - closed - continuous (AP0302); Film formation - force drying (50 - 100C) (AP0504 AP0505); Film formation - stoving (>100°C) (AP0506 AP0507); Film formation - UV/EB radiation curing (AP0701) (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.2

15.3.4. Worker exposure: Product delivery/storage - packaged - outdoor (AP0102); Product delivery/storage - product storage - outdoor (AP0104) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.06 mg/m³ (TRA Workers 3.0)	0.388
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.396

15.3.5. Worker exposure: Product delivery/storage - product storage - indoor (AP0103); Preparation of material for application - closed - continuous (AP0201) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.562

15.3.6. Worker exposure: Waste management - storage of waste prior to removal for off-site management (AP1201) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.06 mg/m³ (TRA Workers 3.0)	0.388

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.396

15.3.7. Worker exposure: Film formation - airdrying - indoor (AP0502) (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.447

15.3.8. Worker exposure: Film formation - airdrying - outdoor (AP0503) (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.7 mg/m³ (ART 1.5)	0.151
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.228

15.3.9. Worker exposure: Preparation of material for application - batch - outdoor (AP0203); Loading of application equipment - batch - outdoor (AP0304); Application equipment cleaning - open - in situ - outdoor (AP0703); Application equipment cleaning - open - off-line - outdoor (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.7 mg/m³ (ART 1.5)	0.151
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.305

15.3.10. Worker exposure: Preparation of material for application - batch - indoor (AP0202); Loading of application equipment - batch - indoor (AP0303); Laboratory use - QC laboratory (AP1101); Application equipment cleaning - open - in situ - indoor (AP0702); Application equipmen (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.524

15.3.11. Worker exposure: Product delivery/storage - bulk - outdoor (AP0101); Preparation of material for application - transfer of material from one container to another - outdoor (AP0205); Loading of application equipment - transfer of material from one container to another - ou (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.604

15.3.12. Worker exposure: Preparation of material for application - transfer of material from one container to another - indoor (AP0204); Loading of application equipment - transfer of material from one container to another - indoor (AP0305); Waste management - transfer of process (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.733

15.3.13. Worker exposure: Application - manual - brush, roller, spreader - coatings - outdoor (AP0404) (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.823

15.3.14. Worker exposure: Application - manual - brush, roller, spreader - coatings - indoor (AP0405); Application - on-line - roller, spreader, flow - printing inks - indoor (AP0406) (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.9 mg/m³ (ART 1.5)	0.286
Dermal, systemic, long term	0.315 mg/kg bw/day (Riskofderm2.1)	0.035
Combined, systemic, long term		0.322

15.3.15. Worker exposure: Application - manual spraying - coatings - outdoor (AP0402) (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45
Dermal, systemic, long term	0.096 mg/kg bw/day (Riskofderm 2.1)	0.011
Combined, systemic, long term		0.461

15.3.16. Worker exposure: Application - manual spraying - coatings - indoor (AP0403) (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.434

15.3.17. Worker exposure: Application - aerosol dispensers (AP0501) (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	10 mg/m³ (ART 1.5)	0.322
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.563

15.3.18. Worker exposure: Application - hand - paints, pastels, pigment powders - indoor (AP0407) (PROC 19)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45
Dermal, systemic, long term	0.018 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.452

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.

- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

16. ES 16: Consumer use; Various products

16.1. Title section

ES name: *AC - Consumer application of coatings*
Product category: Coatings and Paints, Thinners, paint removers (PC 9a), Fillers, putties, plasters, modelling clay (PC 9b), Finger paints (PC 9c)

Environment	
1: *Consumer application of coatings and inks - brushing/rolling (indoor and outdoor)*	ERC 8d, ERC 8a
Consumer	
2: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9a
3: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9a
4: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9a
5: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9a
6: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9b
7: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9b
8: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9b
9: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic*	PC 9c

16.2. Conditions of use affecting exposure

16.2.1. Control of environmental exposure: *Consumer application of coatings and inks - brushing/rolling (indoor and outdoor)* (ERC 8d and 8a)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 0.003 tonnes/day
• Percentage of EU tonnage used at regional scale: = 10 %
• Emission days per year (CEPE): = 365 d/y (Industry knowledge)
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment

demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
• Receiving surface water flow rate: >= 1.8E4 m3/d
• Indoor/outdoor use: Covers Indoor and Outdoor Use
• Type of product use and relevant emission routes: Consumer product use leading to emissions to air
• Type of product use and relevant emission routes: Consumer product use leading to disposal via wastewater
• Type of product use and relevant emission routes: Consumer product use with limited or no technical control of emission

16.2.2. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9a)

Product (article) characteristics
Covers concentrations up to 50 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

16.2.3. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9a)

Product (article) characteristics
Covers concentrations up to 50 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

16.2.4. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9a)

Product (article) characteristics
Covers concentrations up to 50 %

16.2.5. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9a)

Product (article) characteristics
Covers concentrations up to 90 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

16.2.6. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9b)

Product (article) characteristics
Covers concentrations up to 90 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

16.2.7. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9b)

Product (article) characteristics
Covers concentrations up to 90 %
Amount used (or contained in articles), frequency and duration of use/exposure
Product amount per task (grams)

16.2.8. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic* (PC 9b)

Product (article) characteristics
Covers concentrations up to 10 %
No spraying
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Exposure duration = 1 h/event
Covers use up to 1 events per day
For each use event, covers use amounts up to 350 g/event
Information and behavioral advice for consumers
Covers use by adults.
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

16.2.9. Control of consumer exposure: *Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103);*

Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9c)

Product (article) characteristics
Covers concentrations up to 50 %
No spraying
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Exposure duration = 0.75 h/event
Covers use up to 1 events per day
For each use event, covers use amounts up to 20 g/event
Information and behavioral advice for consumers
Covers use by adults.
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to palm of one hand

16.3. Exposure estimation and reference to its source

16.3.1. Environmental release and exposure: Consumer application of coatings and inks - brushing/rolling (indoor and outdoor) (ERC 8d and 8a)

Release	**Release factor estimation method**	**Explanation / Justification**
Water	SpERC based CEPE (ERC8d consumer) - CEPE SPERC 8d.1a.v1 Consumer application of coatings - Consumer application of coatings by brush or roller - outdoor - volatiles	**Initial release factor:** 1% **Final release factor:** 1% **Local release rate:** 0.028 kg/day **Explanation / Justification:** Application equipment (brushes/rollers/containers/roller trays) can be washed in domestic sinks and washings discharged into public sewers. OECD ESD
Air	SpERC based same as above	**Initial release factor:** 98.5% **Final release factor:** 98.5% **Explanation / Justification:** For a coating film to form, the volatile phase of organic solvent borne and water borne coatings must evaporate into the atmosphere. OECD ESD, enhanced with industry data
Soil	SpERC based same as above	**Final release factor:** 0.5% **Explanation / Justification:** During application of coatings outdoors, a proportion of the applied coating can be deposited on the soil below the area being painted. No OECD ESD – industry data

Protection target	**Exposure concentration**	**Risk characterisation**
Freshwater	**Local PEC:** 9.268E-4 mg/L	RCR = 0.172
Sediment (freshwater)	**Local PEC:** 0.227 mg/kg dw	RCR = 0.175
Marine water	**Local PEC:** 7.709E-5 mg/L	RCR = 0.143
Sediment (marine water)	**Local PEC:** 0.019 mg/kg dw	RCR = 0.145
Sewage treatment plant	**Local PEC:** 5.857E-4 mg/L	RCR < 0.01

Protection target	Exposure concentration	Risk characterisation
Agricultural soil	**Local PEC:** 0.006 mg/kg dw	RCR = 0.022
Man via environment - Inhalation	**Local PEC:** 1.686E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

16.3.2. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.6 mg/m³ (ConsExpo 5.0)	0.206
Dermal, systemic, long term	0.15 mg/kg bw/day (ConsExpo 5.0)	0.034
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.239

16.3.3. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.1 mg/m³ (ConsExpo 5.0)	0.141
Dermal, systemic, long term	0.076 mg/kg bw/day (ConsExpo 5.0)	0.017
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.159

16.3.4. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.4 mg/m³ (ConsExpo 5.0)	0.308
Dermal, systemic, long term	0.063 mg/kg bw/day (ConsExpo 5.0)	0.014
Oral, systemic, long term	5.9E-3 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.324

16.3.5. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.1 mg/m³ (ConsExpo 5.0)	0.141
Dermal, systemic, long term	0.019 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.146

16.3.6. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.92 mg/m³ (ConsExpo 5.0)	0.118
Dermal, systemic, long term	5.7E-3 mg/kg bw/day (ConsExpo 5.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.12

16.3.7. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (ConsExpo 5.0)	< 0.01
Dermal, systemic, long term	0.045 mg/kg bw/day (ConsExpo 5.0)	0.01
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 5.0)	< 0.01
Combined, systemic, long term		0.01

16.3.8. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.09E3 mg/m³ (TRA Consumers 3.1)	140.5
Dermal, systemic, long term	14.29 mg/kg bw/day (TRA Consumers 3.1)	3.219
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		143.8

16.3.9. Consumer exposure: Preparation of material for application - batch - indoor (AC0101); Preparation of material for application - transfer of material from one container to another - indoor (AC0103); Loading of application equipment -batch - indoor (AC0201); Loading of applic (PC 9c)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	344.8 mg/m³ (TRA Consumers 3.1)	44.32
Dermal, systemic, long term	17.5 mg/kg bw/day (TRA Consumers 3.1)	3.941
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		48.26

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

17. ES 17: Formulation or re-packing; Adhesives, Sealants (PC 1)

17.1. Title section

ES name: *FEICA F1 - Adhesive manufacturing in closed process / FEICA F2 - Adhesive manufacturing in open process*
Product category: Adhesives, Sealants (PC 1)

Environment	
1: *Formulation of Solvent Borne Adhesives – Volatiles (Large Scale, > 1000 t/a)*	ERC 2
2: *Formulation of Solvent Borne Adhesives – Volatiles (Small Scale, < 1000 t/a)*	ERC 2
3: *Formulation of Water Borne Adhesives – Volatiles*	ERC 2
Worker	
4: *Synthesis and formulation of adhesives in closed processes*	PROC 3
5: *Synthesis and formulation of adhesives in open and batch processes*	PROC 4
6: *Synthesis and formulation of adhesives in open and batch processes*	PROC 4
7: *Synthesis and formulation of adhesives in open and batch processes*	PROC 4
8: *Synthesis and formulation of adhesives in open and batch processes*	PROC 4
9: *Synthesis and formulation of adhesives in open and batch processes*	PROC 5
10: *Synthesis and formulation of adhesives in open and batch processes*	PROC 5
11: *Synthesis and formulation of adhesives in open and batch processes*	PROC 5
12: *Synthesis and formulation of adhesives in open and batch processes*	PROC 5
13: *Synthesis and formulation of adhesives in open and batch processes*	PROC 5
14: *Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes*	PROC 8b
15: *Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes*	PROC 8b
16: *Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes*	PROC 8b
17: *Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes*	PROC 9
18: *Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes*	PROC 9
19: *Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes*	PROC 9

17.2. Conditions of use affecting exposure

17.2.1. Control of environmental exposure: *Formulation of Solvent Borne Adhesives – Volatiles (Large Scale, > 1000 t/a)* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 22.73 tonnes/day *Total EU volume going to the market sector Adhesives and sealants, used in 220 days/year. According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 30 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 5E3 tonnes/year *Total EU volume going to the market sector Adhesives and sealants*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)

Technical and organisational conditions and measures
• Type of Process: Solvent based process
• Indoor/outdoor use: Indoor use (Indoor)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• On-site treatment of off-air: Vapor recovery (adsorption ..) or other technique for reducing volatiles emissions (incineration, thermal oxidation) [Effectiveness Air: 80%]

17.2.2. Control of environmental exposure: *Formulation of Solvent Borne Adhesives – Volatiles (Small Scale, < 1000 t/a)* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 6.64 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year). According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 6 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 1.46E3 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Solvent based process
• Indoor/outdoor use: Indoor use (Indoor)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

17.2.3. Control of environmental exposure: *Formulation of Water Borne Adhesives – Volatiles* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.253 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario. According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 5 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 55.66 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Substance applied in aqueous process solution with negligible volatilization
• Indoor/outdoor use: Indoor use (Indoor)
• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

17.2.4. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Synthesis and formulation of adhesives in closed processes **(PROC 3)**	Assumes process temperature up to 40 °C
Synthesis and formulation of adhesives in open and batch processes **(PROC 4)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
Synthesis and formulation of adhesives in open and batch processes **(PROC 4)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 70 °C
Synthesis and formulation of adhesives in open and batch processes **(PROC 4)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Complete personal enclosure with ventilation *Ensure medium level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Synthesis and formulation of adhesives in open and batch processes **(PROC 4)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 95 % Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Synthesis and formulation of adhesives in open and batch processes **(PROC 5)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
Synthesis and formulation of adhesives in open and batch processes **(PROC 5)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Complete personal enclosure with ventilation *Ensure medium level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Assumes process temperature up to 70 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Synthesis and formulation of adhesives in open and batch processes **(PROC 5)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 %

	General ventilation giving at least 3 ACH Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 70 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Synthesis and formulation of adhesives in open and batch processes **(PROC 5)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Complete personal enclosure with ventilation *Ensure medium level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Synthesis and formulation of adhesives in open and batch processes **(PROC 5)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 95 % Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes **(PROC 8b)**	Local exhaust ventilation; Inhalation - minimum efficiency of 95 % Assumes process temperature up to 40 °C
Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes **(PROC 8b)**	Local exhaust ventilation; Inhalation - minimum efficiency of 95 % Assumes process temperature up to 70 °C
Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes **(PROC 8b)**	Ensure fixed capturing hood is used. *Ensure low level of containment.* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 95 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 % Submerged loading Assumes process temperature up to 155 °C *Transfer of liquid product with flow of 100 - 1000 l/minute* Assumes activities reflect a hot process. *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Open process*
Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes **(PROC 9)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of	*Limit the substance content in the product to 90%* Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in

***adhesives in open and batch processes* (PROC 9)**	semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Splash loading Assumes process temperature up to 70 °C *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
***Synthesis and formulation of adhesives in closed processes* / *Synthesis and formulation of adhesives in open and batch processes* (PROC 9)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 155 °C *Transfer of liquid product with flow of 1 - 10 l/minute* *Transfer of liquid product with flow of: 1 - 10 l/minute* *Handling that reduces contact between product and adjacent air*

17.3. Exposure estimation and reference to its source

17.3.1. Environmental release and exposure: Formulation of Solvent Borne Adhesives – Volatiles (Large Scale, > 1000 t/a) (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 2.1b.v2 - FEICA 2.1b.v2 Formulation of Solvent Borne Adhesives – Volatiles (Large Scale, > 1000 t/a) - Formulation of Solvent Borne Adhesives – Volatiles (Large Scale, > 1000 t/a)	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants.
Air	SpERC based same as above	**Initial release factor:** 0.12% **Final release factor:** 0.024% **Local release rate:** 5.455 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 9.728E-5 mg/kg dw	RCR < 0.01
Man via environment - Inhalation	**Local PEC:** 0.001 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 9.923E-4 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

17.3.2. Environmental release and exposure: Formulation of Solvent Borne Adhesives – Volatiles (Small Scale, < 1000 t/a) (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 2.1c.v2 - FEICA 2.1c.v2 Formulation of Solvent Borne Adhesives – Volatiles (Small Scale) - Formulation of Solvent Borne Adhesives – Volatiles (Small Scale)	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants. Vapor pressure Threshold is 1000Pa.
Air	SpERC based same as above	**Initial release factor:** 3.6% **Final release factor:** 3.6% **Local release rate:** 239 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants. Vapor pressure Threshold is 1000Pa.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants. Vapor pressure Threshold is 1000Pa.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.04 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

17.3.3. Environmental release and exposure: Formulation of Water Borne Adhesives – Volatiles (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 2.2a.v2 - FEICA 2.2a.v2 Formulation of Water Borne Adhesives – Volatiles - Formulation of Water Borne Adhesives – Volatiles	**Initial release factor:** 0.5% **Final release factor:** 0.5% **Local release rate:** 1.265 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants. Vapor pressure Threshold is 1000Pa.
Air	SpERC based same as above	**Initial release factor:** 2.2% **Final release factor:** 2.2% **Local release rate:** 5.566 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants. Vapor pressure Threshold is 1000Pa.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants. Vapor pressure Threshold is 1000Pa.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.397E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 0.001 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

17.3.4. Worker exposure: Synthesis and formulation of adhesives in closed processes (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

17.3.5. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.131

17.3.6. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.408

17.3.7. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.392

17.3.8. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	22.5 mg/m³ (ART 1.5)	0.723
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.762

17.3.9. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.169

17.3.10. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.9 mg/m³ (ART 1.5)	0.254
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.331

17.3.11. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.2 mg/m³ (ART 1.5)	0.103
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.18

17.3.12. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.431

17.3.13. Worker exposure: Synthesis and formulation of adhesives in open and batch processes (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	22.5 mg/m³ (ART 1.5)	0.723
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.801

17.3.14. Worker exposure: Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.436 mg/m³ (TRA Workers 3.0)	0.046
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.123

17.3.15. Worker exposure: Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.182 mg/m³ (TRA Workers 3.0)	0.231
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.308

17.3.16. Worker exposure: Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8 mg/m³ (ART 1.5)	0.257
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.334

17.3.17. Worker exposure: Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.131

17.3.18. Worker exposure: Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.521

17.3.19. Worker exposure: Synthesis and formulation of adhesives in closed processes / Synthesis and formulation of adhesives in open and batch processes (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.2 mg/m³ (ART 1.5)	0.232
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.27

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

18. ES 18: Use at industrial sites; Adhesives, Sealants (PC 1)

18.1. Title section

ES name: *FEICA I1 - Industrial spray application of adhesives / FEICA I2 - Industrial application of adhesives / FEICA I3 - Industrial extrusion or pelletisation*
Product category: Adhesives, Sealants (PC 1)

Environment	
1: *Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives*	ERC 5
2: *Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives*	ERC 5
3: *Industrial Use of Substances other than Solvents in water borne adhesives*	ERC 5
Worker	
4: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 3
5: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 3
6: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 3
7: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 4
8: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 4
9: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 4
10: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 4
11: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 5
12: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 5
13: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 5
14: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 5
15: *Industrial spray application of adhesives*	PROC 7
16: *Industrial spray application of adhesives*	PROC 7
17: *Industrial spray application of adhesives*	PROC 7
18: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating*	PROC 8a
19: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating*	PROC 8a
20: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating*	PROC 8a

21: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 9
22: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 9
23: *Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 9
24: *Industrial application of adhesives by rolling brushing or other coating*	PROC 10
25: *Industrial application of adhesives by rolling brushing or other coating*	PROC 10
26: *Industrial application of adhesives by rolling brushing or other coating*	PROC 10
27: *Industrial application of adhesives by rolling brushing or other coating*	PROC 12
28: *Industrial application of adhesives by rolling brushing or other coating*	PROC 12
29: *Industrial application of adhesives by rolling brushing or other coating*	PROC 12
30: *Industrial application of adhesives by rolling brushing or other coating*	PROC 13
31: *Industrial application of adhesives by rolling brushing or other coating*	PROC 13
32: *Industrial application of adhesives by rolling brushing or other coating*	PROC 13
33: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 14
34: *Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 14
35: *Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation*	PROC 14

18.2. Conditions of use affecting exposure

18.2.1. Control of environmental exposure: *Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives* (ERC 5)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 14.09 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year). According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 0.1 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 3.1E3 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Dry process (no water used in process)
• Indoor/outdoor use: Covers Indoor and Outdoor use (Covers Indoor and Outdoor use)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]

• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

18.2.2. Control of environmental exposure: *Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives* (ERC 5)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 14.09 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year). According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 0.8 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 3.1E3 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Dry process (no water used in process)
• Indoor/outdoor use: Covers Indoor and Outdoor use (Covers Indoor and Outdoor use)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

18.2.3. Control of environmental exposure: *Industrial Use of Substances other than Solvents in water borne adhesives* (ERC 5)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.422 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario. According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 0.1 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 92.83 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*

(based on 220 use days/year)
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Substance applied in aqueous process solution with negligible volatilization
• Indoor/outdoor use: Covers Indoor and Outdoor use (Covers Indoor and Outdoor use)
• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

18.2.4. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 3)**	Assumes process temperature up to 40 °C
Production of preparation or articles by tabletting, compression, extrusion or	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 70 °C

***pelletisation* (PROC 3)**	
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 3)**	*Limit the substance content in the product to 90%* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure medium level containment* Complete segregation with ventilation and filtration of recirculated air Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 4)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 4)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 70 °C
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 4)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 4)**	Complete personal enclosure with ventilation Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
***Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 5)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation	*Limit the substance content in the product to 90%* Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Assumes process temperature up to 70 °C

(PROC 5)	Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation **(PROC 5)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation **(PROC 5)**	Complete personal enclosure with ventilation Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
Industrial spray application of adhesives **(PROC 7)**	Limit the substance content in the mixture to 50 % . Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 95 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Ensure that direction of application is only horizontal or downward. Assumes large workrooms. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
Industrial spray application of adhesives **(PROC 7)**	Limit the substance content in the mixture to 50 % . Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 95 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 95 % Assumes process temperature up to 70 °C Ensure that direction of application is only horizontal or downward. Assumes large workrooms. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
Industrial spray application of adhesives **(PROC 7)**	Limit the substance content in the mixture to 50 % . Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 95 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 97.5 %

	Assumes process temperature up to 155 °C Ensure that direction of application is only downward. Assumes large workrooms. Low application rate (0.03 - 0.3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating **(PROC 8a)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating **(PROC 8a)**	*Limit the substance content in the product to 90%* Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 75 % Splash loading Assumes process temperature up to 70 °C *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating **(PROC 8a)**	*Containment — no extraction - Low level containment* Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 155 °C Assumes large workrooms. *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Open process*
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation **(PROC 9)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation **(PROC 9)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Splash loading Assumes process temperature up to 70 °C *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH*

***preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 9)**	Wear a respirator providing a minimum efficiency of 95 % Splash loading Assumes process temperature up to 155 °C *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
***Industrial application of adhesives by rolling brushing or other coating* (PROC 10)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 75 % Assumes process temperature up to 40 °C Assumes large workrooms. *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
***Industrial application of adhesives by rolling brushing or other coating* (PROC 10)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 70 °C Assumes large workrooms. *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
***Industrial application of adhesives by rolling brushing or other coating* (PROC 10)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 97.5 % Assumes process temperature up to 155 °C Assumes large workrooms. *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour*
***Industrial application of adhesives by rolling brushing or other coating* (PROC 12)**	Assumes process temperature up to 40 °C
***Industrial application of adhesives by rolling brushing or other coating* (PROC 12)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 70 °C
***Industrial application of adhesives by rolling brushing or other coating* (PROC 12)**	*Limit the substance content in the product to 90%* Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Ensure low level containment* Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 75 % Assumes process temperature up to 155 °C Assumes large workrooms. *Activities with agitated surface* *Surface 1 - 3 m²*
***Industrial application of adhesives by rolling brushing or other coating* (PROC 13)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
***Industrial application of adhesives by rolling brushing or other coating* (PROC 13)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 %

	General ventilation giving at least 3 ACH Wear a respirator providing a minimum efficiency of 95 % Assumes process temperature up to 70 °C *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* *Activities with relatively undisturbed open surface of 1 - 3 m²*
***Industrial application of adhesives by rolling brushing or other coating* (PROC 13)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Local exhaust ventilation; Inhalation - minimum efficiency of 90 % *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 99.5 % Assumes process temperature up to 155 °C *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* *Activities with relatively undisturbed open surface of 1 - 3 m²*
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 14)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Assumes process temperature up to 40 °C
***Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 14)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS. Assumes process temperature up to 70 °C
***Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation* (PROC 14)**	Local exhaust ventilation; Inhalation - minimum efficiency of 90 % Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS. Assumes process temperature up to 155 °C

18.3. Exposure estimation and reference to its source

18.3.1. Environmental release and exposure: Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives (ERC 5)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 5.1a.v2 - FEICA 5.1a.v2 Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives - Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the industrial uses of adhesives and sealants. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.
Air	SpERC based same as above	**Initial release factor:** 1.7% **Final release factor:** 1.7% **Local release rate:** 239.5 kg/day **Explanation / Justification:** Regarding environmental emissions,

Release	Release factor estimation method	Explanation / Justification
		the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the industrial uses of adhesives and sealants. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the industrial uses of adhesives and sealants. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.04 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

18.3.2. Environmental release and exposure: Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives (ERC 5)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 5.1b.v2 - FEICA 5.1b.v2 Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives - Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the industrial uses of adhesives and sealants. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.

Release	Release factor estimation method	Explanation / Justification
	Construction Adhesives	
Air	SpERC based same as above	**Initial release factor:** 1.7% **Final release factor:** 1.7% **Local release rate:** 239.5 kg/day **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the industrial uses of adhesives and sealants. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the industrial uses of adhesives and sealants. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.04 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

18.3.3. Environmental release and exposure: Industrial Use of Substances other than Solvents in water borne adhesives (ERC 5)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 5.1c.v2 - FEICA 5.1c.v2 Industrial Use of Substances other than Solvents in water borne adhesives - Industrial Use of Substances other than Solvents in water borne	**Initial release factor:** 0.3% **Final release factor:** 0.3% **Local release rate:** 1.266 kg/day **Explanation / Justification:** The release fractions defined in the OECD Emission Scenario Document for water borne decorative paints in professional and general public use were adapted. Adaptation was done by accounting for the higher degree of efficiency of material use in industrial settings. The corresponding

Release	Release factor estimation method	Explanation / Justification
	adhesives	release factor to water reported in the OECD Emission Scenario Document was divided by three. The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. For the approximation, an amalgamated value of 0.9% was used. This value was divided by three to obtain a release factor of 0.003 (0.3 %) for the emissions to water from industrial use. The corresponding release factor to air is set to 0 following the OECD Emission Scenario Document. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.
Air	SpERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** The release fractions defined in the OECD Emission Scenario Document for water borne decorative paints in professional and general public use were adapted. Adaptation was done by accounting for the higher degree of efficiency of material use in industrial settings. The corresponding release factor to water reported in the OECD Emission Scenario Document was divided by three. The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. For the approximation, an amalgamated value of 0.9% was used. This value was divided by three to obtain a release factor of 0.003 (0.3 %) for the emissions to water from industrial use. The corresponding release factor to air is set to 0 following the OECD Emission Scenario Document. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** The release fractions defined in the OECD Emission Scenario Document for water borne decorative paints in professional and general public use were adapted. Adaptation was done by accounting for the higher degree of efficiency of material use in industrial settings. The corresponding release factor to water reported in the OECD Emission Scenario Document was divided by three. The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. For the approximation, an amalgamated value of 0.9% was used. This value was divided by three to obtain a release factor of 0.003 (0.3 %) for the emissions to water from industrial use. The corresponding release factor to air is set to 0 following the OECD Emission Scenario Document. OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.67
Marine water	**Local PEC:** 3.398E-4 mg/L	RCR = 0.629

Protection target	Exposure concentration	Risk characterisation
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 2.622E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

18.3.4. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

18.3.5. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.189

18.3.6. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.358

18.3.7. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.131

18.3.8. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.408

18.3.9. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.392

18.3.10. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.392

18.3.11. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.1

18.3.12. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	23 mg/m³ (ART 1.5)	0.74
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.747

18.3.13. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.361

18.3.14. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.361

18.3.15. Worker exposure: Industrial spray application of adhesives (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.8 mg/m³ (ART 1.5)	0.219
Dermal, systemic, long term	0.107 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.231

18.3.16. Worker exposure: Industrial spray application of adhesives (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.107 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.527

18.3.17. Worker exposure: Industrial spray application of adhesives (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18.5 mg/m³ (ART 1.5)	0.595
Dermal, systemic, long term	0.107 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.607

18.3.18. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

18.3.19. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.25 mg/m³ (ART1.5)	0.394
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.402

18.3.20. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13 mg/m³ (ART1.5)	0.418
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.426

18.3.21. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.096

18.3.22. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	21 mg/m³ (ART 1.5)	0.675
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.679

18.3.23. Worker exposure: Industrial spray application of adhesives / Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.5 mg/m³ (ART 1.5)	0.466

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.47

18.3.24. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.5 mg/m³ (ART 1.5)	0.177
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.331

18.3.25. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.508

18.3.26. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.25 mg/m³ (ART 1.5)	0.362
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.516

18.3.27. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 12)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.371

18.3.28. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 12)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.371

18.3.29. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 12)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9 mg/m³ (ART 1.5)	0.289
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.291

18.3.30. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.262

18.3.31. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12 mg/m³ (ART 1.5)	0.386
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.463

18.3.32. Worker exposure: Industrial application of adhesives by rolling brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.592

18.3.33. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.172 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.112

18.3.34. Worker exposure: Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.172 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.112

18.3.35. Worker exposure: Industrial application of adhesives by rolling brushing or other coating / Production of preparation or articles by tabletting, compression, extrusion or pelletisation (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.36 mg/m³ (TRA Workers 3.0)	0.462
Dermal, systemic, long term	0.172 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.481

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.

- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

19. ES 19: Use at industrial sites; Adhesives, Sealants (PC 1)

19.1. Title section

ES name: *FEICA PA1 - Industrial Solvent use (Processing aid)*
Product category: Adhesives, Sealants (PC 1)

Environment	
1: *Industrial Use of Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives*	ERC 4
2: *Industrial Use of Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives*	ERC 4
Worker	
3: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 2
4: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 3
5: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 7
6: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 8a
7: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 8b
8: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 10
9: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 13

19.2. Conditions of use affecting exposure

19.2.1. Control of environmental exposure: *Industrial Use of Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.236 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year). According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 0.6 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 52 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures

• Type of Process: Solvent based process
• Indoor/outdoor use: Covers Indoor and Outdoor use (Covers Indoor and Outdoor use)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

19.2.2. Control of environmental exposure: *Industrial Use of Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.236 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year). According to FEICA, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 1.9 tonnes/day. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 52 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Solvent based process
• Indoor/outdoor use: Covers Indoor and Outdoor use (Covers Indoor and Outdoor use)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

19.2.3. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 2)**	Use in closed, continuous process with occasional controlled exposure
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 3)**	-
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 7)**	*Ensure cross-flow spray room is used.* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Wear a respirator providing a minimum efficiency of 97.5 % Ensure that direction of application is only horizontal or downward. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer	*Containment — no extraction - Low level containment* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH*

from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 8a)**	*Transfer of liquid product with flow of: 100 - 1000 l/minute* *Open process*
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 8b)**	Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Submerged loading *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 10)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Assumes large workrooms. *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 13)**	Ensure fixed capturing hood is used. Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* *Activities with relatively undisturbed open surface of 1 - 3 m²*

19.3. Exposure estimation and reference to its source

19.3.1. Environmental release and exposure: Industrial Use of Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 4.2a.v2 - FEICA 4.2a.v2 Industrial use of solvents in paper, board and related products/woodworking and joinery/footwear and leather, textile, other adhesives. - Industrial use of solvents in paper, board and related products/woodworking and joinery/footwear and leather, textile, other adhesives.	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD emission scenario document have been adopted for the SPERC factsheet for the industrial uses of adhesives and sealants. OECD emission scenario document, series no 22 coating industry (paints, lacquers and varnishes), July 2009.
Air	SpERC based same as above	**Initial release factor:** 98.5% **Final release factor:** 98.5% **Local release rate:** 232.5 kg/day **Explanation / Justification:** Regarding environmental emissions,

Release	Release factor estimation method	Explanation / Justification
		the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD emission scenario document have been adopted for the SPERC factsheet for the industrial uses of adhesives and sealants. OECD emission scenario document, series no 22 coating industry (paints, lacquers and varnishes), July 2009.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD emission scenario document have been adopted for the SPERC factsheet for the industrial uses of adhesives and sealants. OECD emission scenario document, series no 22 coating industry (paints, lacquers and varnishes), July 2009.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.039 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

19.3.2. Environmental release and exposure: Industrial Use of Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 4.2b.v2 - FEICA 4.2b.v2 Industrial use of solvents in transportation (automotive:aircraft:rail vehicles) : industrial building construction adhesives - Industrial use of solvents in transportation (automotive:aircraft:rail vehicles) : industrial building construction adhesives	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD emission scenario document have been adopted for the SPERC factsheet for the industrial uses of adhesives and sealants. OECD emission scenario document, series no 22 coating industry (paints, lacquers and varnishes), July 2009.
Air	SpERC based	**Initial release factor:** 98.5%

Release	Release factor estimation method	Explanation / Justification
	same as above	**Final release factor:** 98.5% **Local release rate:** 232.5 kg/day **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD emission scenario document have been adopted for the SPERC factsheet for the industrial uses of adhesives and sealants. OECD emission scenario document, series no 22 coating industry (paints, lacquers and varnishes), July 2009.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Regarding environmental emissions, the industrial use of adhesives and sealants is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD emission scenario document have been adopted for the SPERC factsheet for the industrial uses of adhesives and sealants. OECD emission scenario document, series no 22 coating industry (paints, lacquers and varnishes), July 2009.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.039 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

19.3.3. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

19.3.4. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.558

19.3.5. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18.75 mg/m³ (ART 1.5)	0.603
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.844

19.3.6. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.656

19.3.7. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.656

19.3.8. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.3 mg/m³ (ART 1.5)	0.299
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.453

19.3.9. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer from bulk and semi-bulk and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20 mg/m³ (ART 1.5)	0.643
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.72

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

20. ES 20: Widespread use by professional workers; Adhesives, Sealants (PC 1); Manufacture of other non-metallic mineral products, e.g. plasters, cement (SU 13)

20.1. Title section

ES name: *FEICA P1 - Professional spray application of adhesives indoor / FEICA P2 - Professional application of adhesives indoor / FEICA P3 - Professional spray application of adhesives outdoor / FEICA P4 - Professional application of adhesives outdoor*
Product category: Adhesives, Sealants (PC 1)
Sector of use: Manufacture of other non-metallic mineral products, e.g. plasters, cement (SU 13)

Environment	
1: *Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants*	ERC 8c
Worker	
2: *Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 8a
3: *Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 8a
4: *Professional outdoor spraying of adhesives outside industrial settings / Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 8a
5: *Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 9
6: *Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 9
7: *Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 9
8: *Professional outdoor spraying of adhesives outside industrial settings / Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 9
9: *Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 10
10: *Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 10
11: *Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 10
12: *Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 10
13: *Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 10
14: *Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 10
15: *Professional indoor spraying of adhesives outside industrial settings*	PROC 11
16: *Professional indoor spraying of adhesives outside industrial settings*	PROC 11
17: *Professional indoor spraying of adhesives outside industrial settings*	PROC 11
18: *Professional outdoor spraying of adhesives outside industrial settings*	PROC 11
19: *Professional outdoor spraying of adhesives outside industrial settings*	PROC 11
20: *Professional outdoor spraying of adhesives outside industrial settings*	PROC 11
21: *Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 13
22: *Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 13
23: *Professional indoor application of adhesives by rolling, brushing or other coating*	PROC 13
24: *Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 13
25: *Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 13
26: *Professional outdoor application of adhesives by rolling, brushing or other coating*	PROC 13

20.2. Conditions of use affecting exposure

20.2.1. Control of environmental exposure: *Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants* (ERC 8c)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 0.003 tonnes/day *The fraction of the regional tonnage used locally is 0.002 (identical to the default settings of the REACH guidance). The fraction of the EU tonnage used in region is not specified in the SPERC. The respective value needs to be defined by the registrant based on his intelligence of the market of the substance. 365 emission days are assumed.*
• Percentage of EU tonnage used at regional scale: = 10 %
Technical and organisational conditions and measures
• Type of Process: Application of solvent borne or water-borne products
• Indoor/outdoor use: Covers Indoor and Outdoor Use
• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

20.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Technical and organisational conditions and measures
General good housekeeping practices.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
***Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 40 °C Indoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
Professional indoor spraying	Covers concentrations up to 100 %

***of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 8a)**	Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 97.5 % Splash loading Assumes process temperature up to 155 °C Indoor use *Transfer of liquid product with flow of: 1 - 10 l/minute* *Handling that reduces contact between product and adjacent air*
***Professional outdoor spraying of adhesives outside industrial settings / Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 40 °C Outdoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
***Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 9)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Splash loading Assumes process temperature up to 40 °C Indoor use *Transfer of liquid product with flow of: 1 - 10 l/minute* *Handling that reduces contact between product and adjacent air*
***Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 9)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 70 °C Indoor use *Transfer of liquid product with flow of: 1 - 10 l/minute* *Handling that reduces contact between product and adjacent air*
***Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 9)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 95 % Splash loading Assumes process temperature up to 150 °C Indoor use *Transfer of liquid product with flow of: 0.1 - 1 l/minute* *Handling that reduces contact between product and adjacent air*
***Professional outdoor spraying of adhesives outside industrial settings / Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 9)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Splash loading Assumes process temperature up to 40 °C Outdoor use *Transfer of liquid product with flow of: 1 - 10 l/minute* *Handling that reduces contact between product and adjacent air*
Professional indoor application of adhesives by rolling,	*General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 90 %

***brushing or other coating* (PROC 10)**	*Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Use hand-held tool for dispersion* Application rate = 0.017 L/min
***Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 10)**	*General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 97.5 % *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Use hand-held tool for dispersion* Application rate = 0.017 L/min
***Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 10)**	*General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 99.5 % *Spreading of liquids at surfaces or work pieces 0.1 - 0.3 m² / hour* *Use hand-held tool for dispersion* Application rate = 0.017 L/min
***Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 10)**	*Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Use hand-held tool for dispersion* Application rate = 0.017 L/min
***Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 10)**	*Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 97.5 % *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Use hand-held tool for dispersion* Application rate = 0.017 L/min
***Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 10)**	*Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 99.5 % *Spreading of liquids at surfaces or work pieces 0.1 - 0.3 m² / hour* *Use hand-held tool for dispersion* Application rate = 0.017 L/min
***Professional indoor spraying of adhesives outside industrial settings* (PROC 11)**	*Limit the substance content in the product to 90%* *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 95 % Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only downward.
***Professional indoor spraying of adhesives outside industrial settings* (PROC 11)**	*Limit the substance content in the product to 90%* *General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 99 % Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only downward.
***Professional indoor spraying of adhesives outside industrial settings* (PROC 11)**	*Limit the substance content in the product to 90%* *Ensure low level containment* *General ventilation giving at least 10 ACH* Wear a respirator providing a minimum efficiency of 99.9 % Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker.

	Application rate = 0.3 L/min Ensure that direction of application is only downward.
***Professional outdoor spraying of adhesives outside industrial settings* (PROC 11)**	*Limit the substance content in the product to 90%* *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % *Application by spraying* Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only downward.
***Professional outdoor spraying of adhesives outside industrial settings* (PROC 11)**	*Limit the substance content in the product to 90%* *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 99 % *Application by spraying* Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only downward.
***Professional outdoor spraying of adhesives outside industrial settings* (PROC 11)**	*Limit the substance content in the product to 90%* *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 99.9 % *Application by spraying* Surface spraying with no or low compressed air use Surface spraying of liquids Low application rate (0.03 - 0.3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only downward.
***Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
***Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 97.5 % Assumes process temperature up to 70 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
***Professional indoor application of adhesives by rolling, brushing or other coating* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour).

	Wear a respirator providing a minimum efficiency of 99.5 % Assumes process temperature up to 155 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.1 - 0.3 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
***Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
***Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 97.5 % Assumes process temperature up to 70 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
***Professional outdoor application of adhesives by rolling, brushing or other coating* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 99.5 % Assumes process temperature up to 155 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.1 - 0.3 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*

20.3. Exposure estimation and reference to its source

20.3.1. Environmental release and exposure: Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants (ERC 8c)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 8c.3.v2 (professional and consumer) - FEICA 8c.3.v2 Wide dispersive use of substances other than solvents of adhesives and sealants by professional users and consumers - Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants	**Initial release factor:** 1.5% **Final release factor:** 1.5% **Local release rate:** 0.041 kg/day **Explanation / Justification:** Regarding environmental emissions, the wide dispersive use use of adhesives and sealants is very similar to related wide dispersive uses of paints, lacquers and varnishes. For FEICA 8c.3a.v2 (i.e. for substances other than solvents volatiles in adhesives and sealants) the release fractions defined in the OECD Emission Scenario Document for decorative paints in professional and general public use were used. The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. The value of 1.5% was used. The release of 1.5% reflects the emissions originating from equipment cleaning with water. This release factor is applied as worst case approximation to solvent-borne and water-borne adhesives and paints. The release factor to air is set to 0. OECD Emission Scenario Document Series Nr. 22, Coating Industry (Paints, Lacquers and Varnishes), July 2009
Air	SpERC based	**Initial release factor:** 0% **Final release factor:** 0%

Release	Release factor estimation method	Explanation / Justification
	same as above	**Explanation / Justification:** Regarding environmental emissions, the wide dispersive use use of adhesives and sealants is very similar to related wide dispersive uses of paints, lacquers and varnishes. For FEICA 8c.3a.v2 (i.e. for substances other than solvents volatiles in adhesives and sealants) the release fractions defined in the OECD Emission Scenario Document for decorative paints in professional and general public use were used. The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. The value of 1.5% was used. The release of 1.5% reflects the emissions originating from equipment cleaning with water. This release factor is applied as worst case approximation to solvent-borne and water-borne adhesives and paints. The release factor to air is set to 0. OECD Emission Scenario Document Series Nr. 22, Coating Industry (Paints, Lacquers and Varnishes), July 2009
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Regarding environmental emissions, the wide dispersive use use of adhesives and sealants is very similar to related wide dispersive uses of paints, lacquers and varnishes. For FEICA 8c.3a.v2 (i.e. for substances other than solvents volatiles in adhesives and sealants) the release fractions defined in the OECD Emission Scenario Document for decorative paints in professional and general public use were used. The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. The value of 1.5% was used. The release of 1.5% reflects the emissions originating from equipment cleaning with water. This release factor is applied as worst case approximation to solvent-borne and water-borne adhesives and paints. The release factor to air is set to 0. OECD Emission Scenario Document Series Nr. 22, Coating Industry (Paints, Lacquers and Varnishes), July 2009

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 9.56E-4 mg/L	RCR = 0.177
Sediment (freshwater)	**Local PEC:** 0.234 mg/kg dw	RCR = 0.18
Marine water	**Local PEC:** 8.001E-5 mg/L	RCR = 0.148
Sediment (marine water)	**Local PEC:** 0.02 mg/kg dw	RCR = 0.151
Sewage treatment plant	**Local PEC:** 8.785E-4 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.009 mg/kg dw	RCR = 0.033
Man via environment - Inhalation	**Local PEC:** 1.704E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

20.3.2. Worker exposure: Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.637

20.3.3. Worker exposure: Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	21.75 mg/m³ (ART 1.5)	0.699
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.854

20.3.4. Worker exposure: Professional outdoor spraying of adhesives outside industrial settings / Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12 mg/m³ (ART 1.5)	0.386
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.54

20.3.5. Worker exposure: Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13 mg/m³ (ART 1.5)	0.418
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.495

20.3.6. Worker exposure: Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.3 mg/m³ (ART 1.5)	0.203
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.28

20.3.7. Worker exposure: Professional indoor spraying of adhesives outside industrial settings / Professional indoor application of adhesives by rolling, brushing or other coating (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14.5 mg/m³ (ART 1.5)	0.466
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.543

20.3.8. Worker exposure: Professional outdoor spraying of adhesives outside industrial settings / Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11 mg/m³ (ART 1.5)	0.354
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.431

20.3.9. Worker exposure: Professional indoor application of adhesives by rolling, brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.017 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.484

20.3.10. Worker exposure: Professional indoor application of adhesives by rolling, brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.5 mg/m³ (ART 1.5)	0.563
Dermal, systemic, long term	0.017 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.565

20.3.11. Worker exposure: Professional indoor application of adhesives by rolling, brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	0.017 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.516

20.3.12. Worker exposure: Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12 mg/m³ (ART 1.5)	0.386
Dermal, systemic, long term	0.017 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.388

20.3.13. Worker exposure: Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13.75 mg/m³ (ART 1.5)	0.442
Dermal, systemic, long term	0.017 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.444

20.3.14. Worker exposure: Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13 mg/m³ (ART 1.5)	0.418
Dermal, systemic, long term	0.017 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.42

20.3.15. Worker exposure: Professional indoor spraying of adhesives outside industrial settings (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15.5 mg/m³ (ART 1.5)	0.498
Dermal, systemic, long term	0.11 mg/kg bw/day (Riskofderm 2.1)	0.012
Combined, systemic, long term		0.511

20.3.16. Worker exposure: Professional indoor spraying of adhesives outside industrial settings (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	0.11 mg/kg bw/day (Riskofderm 2.1)	0.012

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.495

20.3.17. Worker exposure: Professional indoor spraying of adhesives outside industrial settings (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17 mg/m³ (ART 1.5)	0.547
Dermal, systemic, long term	0.11 mg/kg bw/day (Riskofderm 2.1)	0.012
Combined, systemic, long term		0.559

20.3.18. Worker exposure: Professional outdoor spraying of adhesives outside industrial settings (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	25 mg/m³ (ART 1.5)	0.804
Dermal, systemic, long term	0.045 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.809

20.3.19. Worker exposure: Professional outdoor spraying of adhesives outside industrial settings (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12 mg/m³ (ART 1.5)	0.386
Dermal, systemic, long term	0.045 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.391

20.3.20. Worker exposure: Professional outdoor spraying of adhesives outside industrial settings (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	23 mg/m³ (ART 1.5)	0.74
Dermal, systemic, long term	0.045 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.745

20.3.21. Worker exposure: Professional indoor application of adhesives by rolling, brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m³ (ART 1.5)	0.482
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.637

20.3.22. Worker exposure: Professional indoor application of adhesives by rolling, brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.5 mg/m³ (ART 1.5)	0.563
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.717

20.3.23. Worker exposure: Professional indoor application of adhesives by rolling, brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.669

20.3.24. Worker exposure: Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12 mg/m³ (ART 1.5)	0.386
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.54

20.3.25. Worker exposure: Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13.75 mg/m³ (ART 1.5)	0.442
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.596

20.3.26. Worker exposure: Professional outdoor application of adhesives by rolling, brushing or other coating (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	26 mg/m³ (ART 1.5)	0.836
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.99

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.

- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

21. ES 21: Widespread use by professional workers; Adhesives, Sealants (PC 1)

21.1. Title section

ES name: *FEICA PA2 - Professional Solvent use, Indoor (Processing aid) / FEICA PA3 - Professional Solvent use, Outdoor (Processing aid)*
Product category: Adhesives, Sealants (PC 1)

Environment	
1: *Wide dispersive Use of Solvents in Adhesives and Sealants*	ERC 8a
Worker	
2: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 8a
3: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 8a
4: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 8b
5: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 8b
6: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 10
7: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 10
8: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 11
9: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 11
10: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 13
11: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning*	PROC 13

21.2. Conditions of use affecting exposure

21.2.1. Control of environmental exposure: *Wide dispersive Use of Solvents in Adhesives and Sealants* (ERC 8a)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 0.003 tonnes/day *The fraction of the regional tonnage used locally is 0.002 (identical to the default settings of the REACH guidance). The fraction of the EU tonnage used in region is not specified in the SPERC. The respective value needs to be defined by the registrant based on his intelligence of the market of the substance. 365 emission days are assumed.*
• Percentage of EU tonnage used at regional scale: = 10 %
Technical and organisational conditions and measures
• Type of Process: Application of solvent borne or water-borne products
• Indoor/outdoor use: Covers Indoor and Outdoor Use

• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

21.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Technical and organisational conditions and measures
General good housekeeping practices.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 40 °C Indoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning **(PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 40 °C Outdoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Splash loading Assumes process temperature up to 40 °C

***tasks); and equipment cleaning* (PROC 8b)**	Indoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
***Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 8b)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Splash loading Assumes process temperature up to 40 °C Outdoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
***Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 10)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour*
***Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 10)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour*
***Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 11)**	*General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 99 % *Application by spraying* Surface spraying with no or low compressed air use Surface spraying of liquids Moderate application rate (0.3 - 3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only horizontal or downward.
***Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 11)**	*Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 99 % *Application by spraying* Surface spraying with no or low compressed air use Surface spraying of liquids Moderate application rate (0.3 - 3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only horizontal or downward.
***Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
Covers the use in coatings	Covers concentrations up to 100 %

***(paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning* (PROC 13)**	Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*

21.3. Exposure estimation and reference to its source

21.3.1. Environmental release and exposure: Wide dispersive Use of Solvents in Adhesives and Sealants (ERC 8a)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based FEICA 8a.3.v2 (professional and consumer) - FEICA 8a.3.v2 Wide dispersive use of of Solvents in adhesives and sealants by professional users and consumers - Wide dispersive Use of Solvents in Adhesives and Sealants	**Initial release factor:** 1.5% **Final release factor:** 1.5% **Local release rate:** 0.041 kg/day **Explanation / Justification:** Regarding environmental emissions, the wide dispersive use use of adhesives and sealants is very similar to related wide dispersive uses of paints, lacquers and varnishes. The release fractions defined in the OECD Emission Scenario Document for decorative paints in professional and general public use were used. . The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. The value of 1.5% was used. The release of 1.5% reflects the emissions originating from equipment cleaning with water. This release factor is applied as worst case approximation to solvent-borne and water-borne adhesives and paints. The release factor to air for FEICA 8c.3b.v2 (i.e. for volatiles in water-borne adhesives and sealants) is were approximated on the basis of the release factor defined for decorative paints in professional use and in general public use. The corresponding release factor to air is set to 98% following the OECD Emission Scenario Document. OECD Emission Scenario Document Series Nr. 22, Coating Industry (Paints, Lacquers and Varnishes), July 2009
Air	SpERC based same as above	**Initial release factor:** 98% **Final release factor:** 98% **Explanation / Justification:** Regarding environmental emissions, the wide dispersive use use of adhesives and sealants is very similar to related wide dispersive uses of paints, lacquers and varnishes. The release fractions defined in the OECD Emission Scenario Document for decorative paints in professional and general public use were used. . The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. The value of 1.5% was used. The release of 1.5% reflects the emissions originating from equipment cleaning with water. This release factor is applied as worst case approximation to solvent-borne and water-borne adhesives and paints. The release factor to air for FEICA 8c.3b.v2 (i.e. for volatiles in water-borne adhesives and sealants) is were approximated on the basis of the release factor defined for decorative paints in professional use and in general public use. The corresponding release factor to air is set to 98% following the OECD Emission Scenario Document. OECD Emission Scenario Document Series Nr. 22, Coating Industry (Paints, Lacquers and Varnishes), July 2009

Release	Release factor estimation method	Explanation / Justification
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Regarding environmental emissions, the wide dispersive use use of adhesives and sealants is very similar to related wide dispersive uses of paints, lacquers and varnishes. The release fractions defined in the OECD Emission Scenario Document for decorative paints in professional and general public use were used. . The OECD Emission Scenario Document specifies two release factors to water, 0 for professional users, 0.015 (i.e. 1.5%) for the general public. The value of 1.5% was used. The release of 1.5% reflects the emissions originating from equipment cleaning with water. This release factor is applied as worst case approximation to solvent-borne and water-borne adhesives and paints. The release factor to air for FEICA 8c.3b.v2 (i.e. for volatiles in water-borne adhesives and sealants) is were approximated on the basis of the release factor defined for decorative paints in professional use and in general public use. The corresponding release factor to air is set to 98% following the OECD Emission Scenario Document. OECD Emission Scenario Document Series Nr. 22, Coating Industry (Paints, Lacquers and Varnishes), July 2009

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 9.56E-4 mg/L	RCR = 0.177
Sediment (freshwater)	**Local PEC:** 0.234 mg/kg dw	RCR = 0.18
Marine water	**Local PEC:** 8.001E-5 mg/L	RCR = 0.148
Sediment (marine water)	**Local PEC:** 0.02 mg/kg dw	RCR = 0.151
Sewage treatment plant	**Local PEC:** 8.785E-4 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.009 mg/kg dw	RCR = 0.033
Man via environment - Inhalation	**Local PEC:** 1.704E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

21.3.2. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.347

21.3.3. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.309

21.3.4. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.733

21.3.5. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.604

21.3.6. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.501

21.3.7. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.463

21.3.8. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20 mg/m³ (ART 1.5)	0.643
Dermal, systemic, long term	0.11 mg/kg bw/day (Riskofderm 2.1)	0.012
Combined, systemic, long term		0.655

21.3.9. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	0.045 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.52

21.3.10. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and

equipment cleaning (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.347

21.3.11. Worker exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials transfer and spraying, brushing and other manual application tasks); and equipment cleaning (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.309

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe

use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

22. ES 22: Consumer use; Adhesives, Sealants

22.1. Title section

ES name: *FEICA C1 - Consumer Use, Adhesive and Sealants, Indoor / FEICA C2 - Consumer Use, Adhesive and Sealants, Outdoor*
Product category: Adhesives, Sealants (PC 1)

Environment	
1: *Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants*	ERC 8c
Consumer	
2: *Consumer use of adhesives and sealants, indoor (B01) - L*	PC 1
3: *Consumer use of adhesives and sealants, indoor (B02) - L*	PC 1
4: *Consumer use of adhesives and sealants, indoor (B03) - L*	PC 1
5: *Consumer use of adhesives and sealants, indoor (B04) - L*	PC 1
6: *Consumer use of adhesives and sealants, indoor (B01) - M*	PC 1
7: *Consumer use of adhesives and sealants, indoor (B02) - M*	PC 1
8: *Consumer use of adhesives and sealants, indoor (B01) - H*	PC 1
9: *Consumer use of adhesives and sealants, indoor (B02) - H*	PC 1

22.2. Conditions of use affecting exposure

22.2.1. Control of environmental exposure: *Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants* (ERC 8c)

The environmental assessment for this use is included under Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants in Exposure Scenario 20.

22.2.2. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B01) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.3. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B02) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.4. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B03) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.5. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B04) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.6. Control of consumer exposure: *Consumer use of adhesives and*

sealants, indoor (B01) - M (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.7. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B02) - M* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.8. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B01) - H* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.2.9. Control of consumer exposure: *Consumer use of adhesives and sealants, indoor (B02) - H* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3. Exposure estimation and reference to its source

22.3.1. Environmental release and exposure: *Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants* (ERC 8c)

The environmental assessment for this use is included under Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants in Exposure Scenario 20.

22.3.2. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B01) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.3. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B02) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.4. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B03) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.5. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B04) - L* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.6. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B01) - M* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.7. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B02) - M* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.8. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B01) - H* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

22.3.9. Consumer exposure: *Consumer use of adhesives and sealants, indoor (B02) - H* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

23. ES 23: Consumer use; Adhesives, Sealants

23.1. Title section

ES name: *FEICA PA4 - Consumer Solvent use, Indoor (Processing aid) / FEICA PA5 - Consumer Solvent use, Outdoor (Processing aid)*
Product category: Adhesives, Sealants (PC 1)

Environment	
1: *Wide dispersive Use of Solvents in Adhesives and Sealants*	ERC 8a
Consumer	
2: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (indoor)*	PC 1
3: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (indoor)*	PC 1
4: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (outdoor)*	PC 1

23.2. Conditions of use affecting exposure

23.2.1. Control of environmental exposure: *Wide dispersive Use of Solvents in Adhesives and Sealants* (ERC 8a)

The environmental assessment for this use is included under Wide dispersive Use of Solvents in Adhesives and Sealants in Exposure scenario 21.

23.2.2. Control of consumer exposure: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (indoor)* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

23.2.3. Control of consumer exposure: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (indoor)* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

23.2.4. Control of consumer exposure: *Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (outdoor)* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

23.3. Exposure estimation and reference to its source

23.3.1. Environmental release and exposure: Wide dispersive Use of Solvents in Adhesives and Sealants (ERC 8a)

The environmental assessment for this use is included under Wide dispersive Use of Solvents in Adhesives and Sealants in Exposure scenario 21.

23.3.2. Consumer exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (indoor) (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

23.3.3. Consumer exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (indoor) (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

23.3.4. Consumer exposure: Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and spraying, brushing, aerosol and other manual application tasks); and equipment cleaning (outdoor) (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

24. ES 24: Formulation or re-packing

24.1. Title section

ES name: *CC-1-1 - Formulation and use of Construction Chemicals; all processes and activities (open system) / CC-1-2 - Formulation and use of Construction Chemicals; all processes and activities (open system without LEV) / CC-2 - Formulation and use of Construction Chemicals; all processes and activities (closed system)*

Environment	
1: *Formulation of Construction Chemicals*	ERC 2
Worker	
2: *Use in closed batch process (synthesis or formulation)*	PROC 3
3: *Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)*	PROC 5
4: *Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)*	PROC 5
5: *Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)*	PROC 5
6: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
7: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
8: *Transfer of substance or preparation into small containers (dedicated filling line, including weighing)*	PROC 9
9: *Transfer of substance or preparation into small containers (dedicated filling line, including weighing)*	PROC 9

24.2. Conditions of use affecting exposure

24.2.1. Control of environmental exposure: *Formulation of Construction Chemicals* (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.253 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario. According to EFCC, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 20 tonnes/day for main components or 5 tonnes/day for additives. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*
• Annual use at a site: <= 55.68 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year)*
• Percentage of EU tonnage used at regional scale: = 100 %
• Emission days per year: = 220 days/year (Industry knowledge)
Technical and organisational conditions and measures
• Type of Process: Solvent based process
• Indoor/outdoor use: Indoor use (Indoor)
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Process efficiency: Process optimized for efficient use of raw materials. (Typical measures may include e.g. - Closed batch systems and / or - Semi-closed transfer system and/or - Batch production of final product Reduced number of transfer and cleaning operations through e.g. - Dedicated storage tanks for raw materials, premixes and final products)
Conditions and measures related to sewage treatment plant

• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse

24.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Use in closed batch process (synthesis or formulation) **(PROC 3)**	Covers concentrations up to 100 %
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **(PROC 5)**	Covers concentrations up to 100 % Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **(PROC 5)**	Covers concentrations up to 100 % *Containment — no extraction - Medium level containment.* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* *Activities with agitated surface* *Surface > 3 m²*
Mixing or blending in batch processes for formulation of	Covers concentrations up to 5 %

***preparations and articles (multistage and/or significant contact)* (PROC 5)**	
***Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)**	Covers concentrations up to 100 % *Containment — no extraction - Low level containment* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Submerged loading *Transfer of liquid product with flow of more than 1000 l/minute* *Transfer of liquid product with flow of: > 1000 l/minute* *Handling that reduces contact between product and adjacent air*
***Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)**	Covers concentrations up to 5 %
***Transfer of substance or preparation into small containers (dedicated filling line, including weighing)* (PROC 9)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Splash loading *Transfer of liquid product with flow of: 10 - 100 l/minute* *Handling that reduces contact between product and adjacent air*
***Transfer of substance or preparation into small containers (dedicated filling line, including weighing)* (PROC 9)**	Covers concentrations up to 5 %

24.3. Exposure estimation and reference to its source

24.3.1. Environmental release and exposure: Formulation of Construction Chemicals (ERC 2)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based EFCC 2.1a.v1 & 2.1b.v1 - EFCC 2.1a.v1, 2.1b.v1 Formulation of Construction Chemicals - Volatile substances (main component and additives) - Volatile substances (main component and additives) for the Formulation of Construction Chemicals.	**Initial release factor:** 0.5% **Final release factor:** 0.5% **Local release rate:** 1.265 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants.
Air	SpERC based same as above	**Initial release factor:** 1% **Final release factor:** 1% **Local release rate:** 2.531 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants.

Release	Release factor estimation method	Explanation / Justification
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the formulation of adhesives and sealants is very similar to that of formulation of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 0.004 mg/L	RCR = 0.658
Sediment (freshwater)	**Local PEC:** 0.87 mg/kg dw	RCR = 0.669
Marine water	**Local PEC:** 3.398E-4 mg/L	RCR = 0.629
Sediment (marine water)	**Local PEC:** 0.083 mg/kg dw	RCR = 0.64
Sewage treatment plant	**Local PEC:** 0.027 mg/L	RCR = 0.015
Agricultural soil	**Local PEC:** 0.261 mg/kg dw	RCR = 1
Man via environment - Inhalation	**Local PEC:** 5.892E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.004 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

24.3.2. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	17.23 mg/m³ (TRA Workers 3.0)	0.554
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.558

24.3.3. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.169

24.3.4. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20 mg/m³ (ART 1.5)	0.643
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.72

24.3.5. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.2

24.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	19 mg/m³ (ART 1.5)	0.611
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.688

24.3.7. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.2

24.3.8. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.617

24.3.9. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.192

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the

communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

25. ES 25: Use at industrial sites

25.1. Title section

ES name: *CC-3-1 - Industrial use of Construction Chemicals, Service life: indoor / CC-3-2 - Industrial use of Construction Chemicals; without spraying, Service life: indoor / CC-4-1 - Industrial use of Construction Chemicals, Service life: outdoor / Industrial use of Construction Chemicals, without spraying, Service life: outdoor*

Product category: PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay

Environment	
1: *Industrial Use of Volatile Substances in Construction Chemicals*	ERC 4
Worker	
2: *Industrial spraying*	PROC 7
3: *Industrial spraying*	PROC 7
4: *Industrial spraying*	PROC 7
5: *Industrial spraying*	PROC 7
6: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
7: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
8: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
9: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities*	PROC 8b
10: *Roller application or brushing*	PROC 10
11: *Roller application or brushing*	PROC 10
12: *Roller application or brushing*	PROC 10
13: *Roller application or brushing*	PROC 10
14: *Treatment of articles by dipping and pouring*	PROC 13
15: *Treatment of articles by dipping and pouring*	PROC 13
16: *Treatment of articles by dipping and pouring*	PROC 13
17: *Treatment of articles by dipping and pouring*	PROC 13
18: *Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4)*	PROC 14
19: *Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4)*	PROC 14
20: *Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4)*	PROC 14

25.2. Conditions of use affecting exposure

25.2.1. Control of environmental exposure: *Industrial Use of Volatile Substances in Construction Chemicals* (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.236 tonnes/day *Maximum daily tonnage that can be used safely at a site under the conditions of this contributing scenario (based on 220 use days/year) According to EFCC, the default daily use amount (the substance maximum use rate in a typical operation (Msperc)) is 2 tonnes/day for main components and 0.5 tonnes/day for additives. It is a typical site tonnage, based on sector knowledge. 220 emission days per year are assumed.*

• Annual use at a site: <= 52 tonnes/year *Maximum yearly tonnage that can be used safely at a site under the conditions of this contributing scenario*
• Percentage of EU tonnage used at regional scale: = 100 %
Technical and organisational conditions and measures
• Type of Process: Solvent based process
• Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
• Indoor/outdoor use: Covers Indoor and Outdoor use (Covers Indoor and Outdoor use)
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 100%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d
• General good practice: Trained staff, spill protection including waste reuse

25.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Industrial spraying **(PROC 7)**	Covers concentrations up to 100 % *Use in cross-flow spray room* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 99 % Indoor use Ensure that direction of application is only horizontal or downward.

	Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
***Industrial spraying* (PROC 7)**	Covers concentrations up to 100 % *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Wear a respirator providing a minimum efficiency of 99.5 % Outdoor use Ensure that direction of application is only horizontal or downward. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
***Industrial spraying* (PROC 7)**	Covers concentrations up to 5 % *Use in cross-flow spray room* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use Ensure that direction of application is only horizontal or downward. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
***Industrial spraying* (PROC 7)**	Covers concentrations up to 5 % *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Wear a respirator providing a minimum efficiency of 90 % Outdoor use Ensure that direction of application is only horizontal or downward. Moderate application rate (0.3 - 3 l/minute) Surface spraying of liquids Surface spraying with no or low compressed air use
***Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Submerged loading Indoor use *Transfer of liquid product with flow of: 100 - 1000 l/minute* *Handling that reduces contact between product and adjacent air*
***Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)**	Covers concentrations up to 100 % Outdoor use
***Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)**	Covers concentrations up to 5 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
***Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)**	Covers concentrations up to 5 % Outdoor use

Roller application or brushing **(PROC 10)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Indoor use *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
Roller application or brushing **(PROC 10)**	Covers concentrations up to 100 % *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Wear a respirator providing a minimum efficiency of 90 % Outdoor use *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
Roller application or brushing **(PROC 10)**	Covers concentrations up to 5 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour*
Roller application or brushing **(PROC 10)**	Covers concentrations up to 5 % *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* Outdoor use
Treatment of articles by dipping and pouring **(PROC 13)**	Covers concentrations up to 100 % Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Indoor use *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* *Activities with relatively undisturbed open surface of 1 - 3 m²*
Treatment of articles by dipping and pouring **(PROC 13)**	Covers concentrations up to 100 % *Covers sources located close to buildings* Demonstrable and effective housekeeping practices are in place.; Use in semi-closed process with opportunity for exposure Wear a respirator providing a minimum efficiency of 90 % Outdoor use *Spreading of liquids at surfaces or work pieces 1 - 3 m² / hour* *Activities with relatively undisturbed open surface of 1 - 3 m²*
Treatment of articles by dipping and pouring **(PROC 13)**	Covers concentrations up to 5 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use
Treatment of articles by dipping and pouring **(PROC 13)**	Covers concentrations up to 5 % Outdoor use
Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4) **(PROC 14)**	Covers concentrations up to 100 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS. Indoor use

Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4) **(PROC 14)**	Covers concentrations up to 100 % Outdoor use
Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4) **(PROC 14)**	Covers concentrations up to 5 % Provide a basic standard of general ventilation (1 to 3 air changes per hour). Indoor use

25.3. Exposure estimation and reference to its source

25.3.1. Environmental release and exposure: *Industrial Use of Volatile Substances in Construction Chemicals* (ERC 4)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based EFCC 4.1a.v1 & 4.1b.v1 - EFCC 4.1a.v1, 4.1b.v1 Industrial Use of Volatile and Non-Volatile Substances in Construction Chemicals - volatile substances (main components and additives) - Industrial use of volatile substances (main components and additives) in Construction Chemicals	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the industrial use of construction chemicals is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants
Air	SpERC based same as above	**Initial release factor:** 98.5% **Final release factor:** 98.5% **Local release rate:** 232.5 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the industrial use of construction chemicals is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the industrial use of construction chemicals is very similar to related industrial uses of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the formulation of adhesives and sealants

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 8.685E-4 mg/L	RCR = 0.161
Sediment (freshwater)	**Local PEC:** 0.213 mg/kg dw	RCR = 0.164
Marine water	**Local PEC:** 7.125E-5 mg/L	RCR = 0.132

Protection target	Exposure concentration	Risk characterisation
Sediment (marine water)	**Local PEC:** 0.017 mg/kg dw	RCR = 0.134
Sewage treatment plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.004 mg/kg dw	RCR = 0.014
Man via environment - Inhalation	**Local PEC:** 0.039 mg/m³	RCR ≤ 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR ≤ 0.005

25.3.2. Worker exposure: *Industrial spraying* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.5 mg/m³ (ART 1.5)	0.241
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.482

25.3.3. Worker exposure: *Industrial spraying* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8 mg/m³ (ART 1.5)	0.257
Dermal, systemic, long term	2.143 mg/kg bw/day (TRA Workers 3.0)	0.241
Combined, systemic, long term		0.498

25.3.4. Worker exposure: *Industrial spraying* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	22 mg/m³ (ART 1.5)	0.707
Dermal, systemic, long term	0.429 mg/kg bw/day (TRA Workers 3.0)	0.048
Combined, systemic, long term		0.756

25.3.5. Worker exposure: *Industrial spraying* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	0.429 mg/kg bw/day (TRA Workers 3.0)	0.048
Combined, systemic, long term		0.203

25.3.6. Worker exposure: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.656

25.3.7. Worker exposure: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.11 mg/m³ (TRA Workers 3.0)	0.647
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.724

25.3.8. Worker exposure: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.2

25.3.9. Worker exposure: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.022 mg/m³ (TRA Workers 3.0)	0.129
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.145

25.3.10. Worker exposure: *Roller application or brushing* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20 mg/m³ (ART 1.5)	0.643
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.797

25.3.11. Worker exposure: *Roller application or brushing* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.669

25.3.12. Worker exposure: *Roller application or brushing* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	18 mg/m³ (ART 1.5)	0.579
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	0.031
Combined, systemic, long term		0.61

25.3.13. Worker exposure: *Roller application or brushing* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	14 mg/m³ (ART 1.5)	0.45
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	0.031
Combined, systemic, long term		0.481

25.3.14. Worker exposure: *Treatment of articles by dipping and pouring* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20 mg/m³ (ART 1.5)	0.643
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.72

25.3.15. Worker exposure: *Treatment of articles by dipping and pouring* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.077
Combined, systemic, long term		0.592

25.3.16. Worker exposure: *Treatment of articles by dipping and pouring* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	11.49 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.385

25.3.17. Worker exposure: *Treatment of articles by dipping and pouring* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.044 mg/m³ (TRA Workers 3.0)	0.259
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.015
Combined, systemic, long term		0.274

25.3.18. Worker exposure: *Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4)* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.873 mg/m³ (TRA Workers 3.0)	0.092
Dermal, systemic, long term	0.172 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.112

25.3.19. Worker exposure: *Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4)* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.11 mg/m³ (TRA Workers 3.0)	0.647
Dermal, systemic, long term	0.172 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.666

25.3.20. Worker exposure: *Production of preparations or articles by tabletting, compression, extrusion, pelettisation (EFCC 4)* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.746 mg/m³ (TRA Workers 3.0)	0.185
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.189

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the

communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

26. ES 26: Widespread use by professional workers

26.1. Title section

ES name: *CC-5-1 - Professional use of Construction Chemicals, indoor / CC-5-2 - Professional use of Construction Chemicals, indoor, without spraying / CC-6-1 - Professional use of Construction Chemicals, outdoor / CC-6-2 - Professional use of Construction Chemicals, outdoor, without spraying*

Product category: PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay

Environment	
1: *Wide dispersive Use of Substances in Professional and DIY Construction Chemicals*	ERC 8d, ERC 8a
Worker	
2: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (EFCC 7)*	PROC 8a
3: *Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (EFCC 9)*	PROC 8a
4: *Roller application or brushing (EFCC 7)*	PROC 10
5: *Roller application or brushing (EFCC 9)*	PROC 10
6: *Non industrial spraying (EFCC 7)*	PROC 11
7: *Non industrial spraying (EFCC 9)*	PROC 11
8: *Treatment of articles by dipping and pouring (EFCC 7)*	PROC 13
9: *Treatment of articles by dipping and pouring (EFCC 9)*	PROC 13

26.2. Conditions of use affecting exposure

26.2.1. Control of environmental exposure: *Wide dispersive Use of Substances in Professional and DIY Construction Chemicals* (ERC 8d and 8a)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: <= 0.003 tonnes/day *The value of the Fraction of Regional tonnage used locally is identical to the default settings of the REACH Guidance (0.002). The respective value needs to be defined by the registrant based on his intelligence of the market of the substance. 365 emission days*
• Percentage of EU tonnage used at regional scale: = 10 %
Technical and organisational conditions and measures
• Type of process: Application of solvent borne or water-borne products
• Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
• Process efficiency: Process with efficient use of raw materials. (Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems)
• Indoor/outdoor use: Covers indoor and outdoor use
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 95.74%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure

• Receiving surface water flow rate: >= 1.8E4 m3/d

26.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Technical and organisational conditions and measures
General good housekeeping practices.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (EFCC 7) **(PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 40 °C Indoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (EFCC 9) **(PROC 8a)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Splash loading Assumes process temperature up to 40 °C Outdoor use *Transfer of liquid product with flow of: 10 - 100 l/minute* *Open process*
Roller application or brushing (EFCC 7) **(PROC 10)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour*
Roller application or brushing (EFCC 9) **(PROC 10)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour*
Non industrial spraying (EFCC 7) **(PROC 11)**	*General ventilation giving at least 3 ACH* Wear a respirator providing a minimum efficiency of 99 % Surface spraying with no or low compressed air use Surface spraying of liquids

	Moderate application rate (0.3 - 3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only horizontal or downward.
Non industrial spraying (EFCC 9) **(PROC 11)**	*Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 99 % *Application by spraying* Surface spraying with no or low compressed air use Surface spraying of liquids Moderate application rate (0.3 - 3 l/minute) Vehicle (carrier); High volatile liquid Ensure that the direction of airflow is clearly away from the worker. Application rate = 0.3 L/min Ensure that direction of application is only horizontal or downward.
Treatment of articles by dipping and pouring (EFCC 7) **(PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *General ventilation giving at least 3 ACH* Provide a basic standard of general ventilation (1 to 3 air changes per hour). Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Indoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*
Treatment of articles by dipping and pouring (EFCC 9) **(PROC 13)**	Covers concentrations up to 100 % Covers use up to 8 h/day *Covers sources located close to buildings* Wear a respirator providing a minimum efficiency of 90 % Assumes process temperature up to 40 °C Outdoor use *Spreading of liquids at surfaces or work pieces 0.3 - 1 m² / hour* *Activities with relatively undisturbed open surface of 0.3 - 1 m²*

26.3. Exposure estimation and reference to its source

26.3.1. Environmental release and exposure: Wide dispersive Use of Substances in Professional and DIY Construction Chemicals (ERC 8d)

Release	Release factor estimation method	Explanation / Justification
Water	SpERC based EFCC 8d.1a.v1 (professional and consumer, also covering 8a) - EFCC 8d.1a.v1, EFCC 8a.1a.v1 Wide dispersive Use of Substances in Professional and DIY Construction Chemicals - volatile substances in construction chemicals - Wide dispersive use of volatile substances in construction chemicals, outdoor (also covers indoor)	**Initial release factor:** 1% **Final release factor:** 1% **Local release rate:** 0.028 kg/day **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the wide dispersive use of adhesives and sealants is very similar to the wide dispersive use of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the wide dispersive use of adhesives and sealants.
Air	SpERC based	**Initial release factor:** 98% **Final release factor:** 98%

Release	Release factor estimation method	Explanation / Justification
	same as above	**Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the wide dispersive use of adhesives and sealants is very similar to the wide dispersive use of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the wide dispersive use of adhesives and sealants.
Soil	SpERC based same as above	**Final release factor:** 0% **Explanation / Justification:** OECD Emission Scenario Document, Series No. 22 Coating Industry (Paints, Lacquers and Varnishes), July 2009. Regarding environmental emissions, the wide dispersive use of adhesives and sealants is very similar to the wide dispersive use of paints, lacquers and varnishes. For that reason, release fractions defined in the OECD Emission Scenario Document have been adopted for the SPERC Factsheet for the wide dispersive use of adhesives and sealants.

Protection target	Exposure concentration	Risk characterisation
Freshwater	**Local PEC:** 9.268E-4 mg/L	RCR = 0.172
Sediment (freshwater)	**Local PEC:** 0.227 mg/kg dw	RCR = 0.175
Marine water	**Local PEC:** 7.709E-5 mg/L	RCR = 0.143
Sediment (marine water)	**Local PEC:** 0.019 mg/kg dw	RCR = 0.145
Sewage treatment plant	**Local PEC:** 5.857E-4 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 0.006 mg/kg dw	RCR = 0.022
Man via environment - Inhalation	**Local PEC:** 1.686E-4 mg/m³	RCR < 0.005
Man via environment - Oral	**Exposure via food consumption:** 0.001 mg/kg bw/day	RCR < 0.005
Man via environment - combined routes		RCR < 0.005

26.3.2. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (EFCC 7) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.347

26.3.3. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (EFCC 9) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.309

26.3.4. Worker exposure: Roller application or brushing (EFCC 7) (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.501

26.3.5. Worker exposure: Roller application or brushing (EFCC 9) (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	2.743 mg/kg bw/day (TRA Workers 3.0)	0.309
Combined, systemic, long term		0.463

26.3.6. Worker exposure: Non industrial spraying (EFCC 7) (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20 mg/m³ (ART 1.5)	0.643
Dermal, systemic, long term	0.11 mg/kg bw/day (Riskofderm 2.1)	0.012
Combined, systemic, long term		0.655

26.3.7. Worker exposure: Non industrial spraying (EFCC 9) (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	16 mg/m³ (ART 1.5)	0.514
Dermal, systemic, long term	0.045 mg/kg bw/day (Riskofderm 2.1)	< 0.01
Combined, systemic, long term		0.52

26.3.8. Worker exposure: Treatment of articles by dipping and pouring (EFCC 7) (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6 mg/m³ (ART 1.5)	0.193
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.347

26.3.9. Worker exposure: Treatment of articles by dipping and pouring (EFCC 9) (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.8 mg/m³ (ART 1.5)	0.154
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.154
Combined, systemic, long term		0.309

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.

27. ES 27: Consumer use; Various products

27.1. Title section

ES name: *CC-7 - Consumer use of Construction Chemicals, indoor / CC-8 - Consumer use of Construction Chemicals, outdoor*
Product category: Adhesives, Sealants (PC 1), Coatings and Paints, Thinners, paint removers (PC 9a), Fillers, putties, plasters, modelling clay (PC 9b)

Environment	
1: *Wide dispersive Use of Substances in Professional and DIY Construction Chemicals*	ERC 8d, ERC 8a
Consumer	
2: *Indoor application*	PC 1
3: *Indoor application*	PC 1
4: *Indoor application*	PC 1
5: *Indoor application*	PC 1
6: *Indoor application*	PC 9a
7: *Indoor application*	PC 9a
8: *Indoor application*	PC 9a
9: *Indoor application*	PC 9a
10: *Indoor application*	PC 9b
11: *Indoor application*	PC 9b
12: *Indoor application*	PC 9b

27.2. Conditions of use affecting exposure

27.2.1. Control of environmental exposure: *Wide dispersive Use of Substances in Professional and DIY Construction Chemicals* (ERC 8d)

The environmental assessment for this use is included under Wide dispersive Use of Substances in Professional and DIY Construction Chemicals in Exposure scenario 26.

27.2.2. Control of consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.3. Control of consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.4. Control of consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.5. Control of consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.6. Control of consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.7. Control of consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.8. Control of consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.9. Control of consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.10. Control of consumer exposure: *Indoor application* (PC 9b)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.11. Control of consumer exposure: *Indoor application* (PC 9b)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.2.12. Control of consumer exposure: *Indoor application* (PC 9b)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

This use is specifically advised against for children, as it is banned based on the citral content in the product (modelling clay) under the EU Toy Directive (2009/48/EC).

27.3. Exposure estimation and reference to its source

27.3.1. Environmental release and exposure: *Wide dispersive Use of Substances in Professional and DIY Construction Chemicals* (ERC 8d)

The environmental assessment for this use is included under Wide dispersive Use of Substances in Professional and DIY Construction Chemicals in Exposure scenario 26.

27.3.2. Consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.3. Consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.4. Consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.5. Consumer exposure: *Indoor application* (PC 1)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.6. Consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.7. Consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.8. Consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.9. Consumer exposure: *Indoor application* (PC 9a)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.10. Consumer exposure: *Indoor application* (PC 9b)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.11. Consumer exposure: *Indoor application* (PC 9b)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

27.3.12. Consumer exposure: *Indoor application* (PC 9b)

This use is advised against as the concentration of the substance in the product is up to 30%, which is well above the threshold for skin sensitisation of 1% as included in the CLP Regulation (1272/2008/EC). Therefore the risk for skin sensitisation is not controlled and the product cannot be used safely by a consumer.

This use is specifically advised against for children, as it is banned based on the citral content in the product (modelling clay) under the EU Toy Directive (2009/48/EC).

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

How to determine compliance to the exposure scenarios

The risk assessment was prepared using Chesar 3.4. The substance is a UVCB and therefore the assessment entity approach was used. For the environment the lead component was identified as Limonene. For the human health exposure assessment, the substance as a whole was assessed (UVCB).

Environment

For the environment the following needs to be assessed:

- The amounts used per site given in section x.2.x. Control of environmental exposure is the maximum amount (kg/day, kg/year) that may be used safely.
- The emission to air, soil and water needs to be below the percentages listed in section x.2.x environmental exposure.
- The listed waste water treatment plant and as a minimum the listed effluent.

A use is within the boundaries of the ES if all of the above can be demonstrated. Scaling is not allowed for the environment. If a use is outside of the boundaries of the ES and your company is unable to meet the communicated conditions of use, you can either make your use and corresponding conditions known to your supplier and request an assessment to be made or you can make a downstream user risk assessment.

Human Health

General verification of compliance with operational conditions and risk management measures

A downstream user works within the boundaries of this ES if he fulfills the conditions of use as outlined in section x.2.x and if:

- The listed technical risk management measures have been properly designed, installed, maintained and operated.
- Organizational measures have been implemented adequately and supervision in accordance with standards applicable to the relevant management systems is in place.
- The prescribed or comparable (fitting to tasks and person) Personal Protective Equipment providing the listed protection level are used correctly, workers are trained periodically, and supervision is in place.

If the use of a downstream user does not fit with the conditions listed in section 2 of the exposure scenario he may use scaling to verify that his set of operational conditions and risk management measures still lead to a safe use. In adapting the operational conditions and risk management measures the hierarchy of control needs to be used.

When scaling, the same exposure estimation model (e.g. ECETOC TRA) as specified in section x.2.x, should be used. As the product is used in a range of consumer products, the maximum value of the 8 hours work shift Risk Characterization Ratio (RCR) considered safe is 0.86. To demonstrate that the use of the downstream user is within the boundaries of the Exposure Scenario, he will need to adapt the set of operational conditions and risk management measures so that his RCR is below the one listed for the contributing scenario.

Adapting the RCR if shift duration is longer than 8 hours

The listed long term systemic DNEL is only relevant for a shift length up to 8 hours. If the shift duration is higher than 8 hours per day, the long term systemic DNELs have to be adapted by using the following equation, derived from the Brief and Scala model:

DNEL Reduction Factor = (8 / hours worked in shift) x ((24 – hours worked in shift) / 16).

This equation cannot be used to adapt a DNEL for a shift duration shorter than 8 hours.
With the adapted DNEL, the DU can recalculate the RCR by dividing the exposure estimation in section 3 by the adapted DNEL. If the RCR is smaller than 0.86, the use is still safe.