UNIQUE® BEAUTY

Sikkerhedsdatablad

i henhold til forordning (EF) nr. 1907/2006 (REACH)

1011 Appelsinolie

Nummer for version: V 6.0
Erstatter version af: 13.07.2022 (V 5)

Revision: 08.02.2023

PUNKT 1: Identifikation af stoffet/blandingen og af selskabet/virksomheden

1.1 Produktidentifikator

Identifikation af stoffet	**Appelsinolie sød Brasilien**
Registreringsnummer (REACH)	01-2119493353-35-0024
EF-nummer	232-433-8
CAS-nummer	8028-48-6, 8008-57-9
Artikelnummer	0000 1011
Unik formel identifikator (UFI)	D300-W0XH-C00W-GQQN

1.2 Relevante identificerede anvendelser for stoffet eller blandingen samt anvendelser, der frarådes

Relevante identificerede anvendelser	Faglig anvendelse
Anvendelser, der frarådes	Produktet er ikke beregnet til forbrugeranvendelse.

1.3 Nærmere oplysninger om leverandøren af sikkerhedsdatabladet

UNIQUE PRODUCTS APS, GØRTLERVEJ 6, DK-7000 FREDERICIA

TLF. +45 40194002 E-MAIL (kompetent person): hr@unique-products.dk

1.4 Nødtelefon

Kontakt Giftlinjen på telefon +45 82 12 12 12 (åbent 24 timer i døgnet). Se punkt 4 om førstehjælpsforanstaltninger.

PUNKT 2: Fareidentifikation

2.1 Klassificering af stoffet eller blandingen

Klassificering i henhold til forordning (EF) nr. 1272/2008 (CLP)

Punkt	Fareklasse	Fareklasse og -kategori	Faresætning
2.6	brandfarlig væske	Flam. Liq. 3	H226
3.2	hudætsning/hudirritation	Skin Irrit. 2	H315
3.4S	hudsensibilisering	Skin Sens. 1	H317
3.10	aspirationsfare	Asp. Tox. 1	H304
4.1C	farlig for vandmiljøet, kronisk (langvarig) fare	Aquatic Chronic 2	H411

Den fulde ordlyd af forkortelser: se PUNKT 16.

2.2 Mærkningselementer

Mærkning i henhold til forordning (EF) nr. 1272/2008 (CLP)

- Signalord fare

- Piktogrammer

GHS02, GHS07, GHS08, GHS09

- Faresætninger

H226	Brandfarlig væske og damp.
H304	Kan være livsfarligt, hvis det indtages og kommer i luftvejene.
H315	Forårsager hudirritation.
H317	Kan forårsage allergisk hudreaktion.
H411	Giftig for vandlevende organismer, med langvarige virkninger.

- Sikkerhedssætninger

P210	Holdes væk fra varme, varme overflader, gnister, åben ild og andre antændelseskilder. Rygning forbudt.
P280	Bær beskyttelseshandsker/beskyttelsestøj/øjenbeskyttelse/ansigtsbeskyttelse/høreværn/....
P301+P310	I TILFÆLDE AF INDTAGELSE: Ring omgående til en GIFTINFORMATION/læge.
P331	Fremkald IKKE opkastning.
P370+P378	Ved brand: anvend sand, kuldioxid eller brandslukker til brandslukning.
P403+P235	Opbevares på et godt ventileret sted. Opbevares køligt.
P405	Opbevares under lås.
P501	Indholdet/beholderen bortskaffes i overensstemmelse med lokale/regionale/nationale/internationale regler.

2.3 Andre farer

ikke relevant

PUNKT 3: Sammensætning af/oplysning om indholdsstoffer

3.1 Stoffer

Stoffets navn	Sød appelsinolie Brasilien (UVCB)
Identifikatorer	
REACH reg. nr.	01-2119493353-35-0024
CAS-nr.	8028-48-6, 8008-57-9
EF-nr.	232-433-8

Urenheder og tilsætningsstoffer, klassificering iht. GHS

Stoffets navn	Produktidentifikator	Vægt%
(R)-p-mentha-1,8-dien	CAS-nr. 5989-27-5 68606-81-5 EF-nr. 227-813-5	≥ 90
Myrcene	CAS-nr. 123-35-3 EF-nr. 204-622-5	1 – < 3
alpha-Pinene	CAS-nr. 80-56-8 EF-nr. 201-291-9	< 1

Urenheder og tilsætningsstoffer, klassificering iht. GHS

Stoffets navn	Produktidentifikator	Vægt%
Linalool	CAS-nr. 78-70-6 EF-nr. 201-134-4	< 1
3,7,7-trimethylbicyclo[4.1.0]hept-3-en	CAS-nr. 13466-78-9 EF-nr. 236-719-3	< 1

Den fulde ordlyd af forkortelser: se PUNKT 16.

PUNKT 4: Førstehjælpsforanstaltninger

4.1 Beskrivelse af førstehjælpsforanstaltninger

Generelle bemærkninger

Efterlad ikke ofret alene. Fjern ofret fra farezonen. Sørg for, at personen er varm, ikke bevæger sig og er tildækket. Tilsmudset tøj tages straks af. I alle tilfælde af tvivl, eller hvis symptomer vedvarer, søges læge. I tilfælde af bevidstløshed placeres personen i hvilestilling. Giv aldrig noget i munden.

Efter indånding

Hvis vejrtrækningen er uregelmæssig eller stoppet, søges øjeblikkeligt lægehjælp, og førstehjælp begyndes. Kontakt en læge i tilfælde af irritation af luftvejene. Sørg for frisk luft.

Efter hudkontakt

Vask med rigeligt sæbe og vand.

Efter øjenkontakt

Fjern eventuelle kontaktlinser, hvis dette kan gøres let. Fortsæt skylning. Skyl grundigt med rent, frisk vand i mindst 10 minutter og åbn øjnene godt op.

Efter indtagelse

Skyl munden med vand (kun hvis personen er ved bevidsthed). Fremkald IKKE opkastning.

4.2 Vigtigste symptomer og virkninger, både akutte og forsinkede

Symptomer og virkninger er endnu ikke kendte.

4.3 Angivelse af om øjeblikkelig lægehjælp og særlig behandling er nødvendig

ingen

PUNKT 5: Brandbekæmpelse

5.1 Slukningsmidler

Egnede slukningsmidler

Vandspraystråle, Alkoholbestandigt skum, BC-pulver, Carbondioxid (CO_2)

Uegnede slukningsmidler

Vandstråle

5.2 Særlige farer i forbindelse med stoffet eller blandingen

I tilfælde af utilstrækkelig ventilation og/eller ved brug kan brandbare/eksplosive damp-luftblandinger dannes. Opløsningsmiddeldampe er tungere end luft og spredes langs gulvet. Det kan navnlig forventes, at der er brændbare stoffer eller blandinger til stede i områder, som ikke ventileres, f.eks. uventilerede underjordiske områder som gruber, kanaler og skakte.

5.3 Anvisninger for brandmandskab

Undgå at indånde røgen ved brand eller eksplosion. Afstem brandbekæmpelsen efter omgivelserne. Lad ikke brandslukningsvand løbe ned i afløb eller vandløb. Opsaml forurenet brandslukningsvand separat. Træf normale foranstaltninger mod brand og bekæmp den på en fornuftig afstand.

PUNKT 6: Forholdsregler over for udslip ved uheld

6.1 Personlige sikkerhedsforanstaltninger, personlige værnemidler og nødprocedurer

For ikke-indsatspersonel

Flyt personen i sikkerhed.

For indsatspersonel

Brug vejrtrækningsapparat hvis udsat for dampe/støv/tåge/gasser.

6.2 Miljøbeskyttelsesforanstaltninger

Holdes væk fra afløb, overfladevand og grundvand. Opsaml forurenet vaskevand og bortskaf det. Hvis stoffet er kommet ned i vandløb eller kloak, skal den ansvarlige myndighed informeres.

6.3 Metoder og udstyr til inddæmning og oprensning

Råd om, hvordan spild inddæmmes

Tildækning af afløb

Råd om, hvordan der renses op efter spild

Tørres op med absorberende materiale (f.eks. klud, fleece). Udslip opsamles: savsmuld, kiselgur (diatomit), sand, universelt bindemiddel

Egnede inddæmningsteknikker

Brug af absorberende materiale.

Andre oplysninger om spild og udslip

Placeres i egnede beholdere til bortskaffelse. Udluft det berørte område.

6.4 Henvisning til andre punkter

Personlige værnemidler: se punkt 8. Materialer, der skal undgås: se punkt 10. Forhold vedrørende bortskaffelse: se punkt 13.

PUNKT 7: Håndtering og opbevaring

7.1 Forholdsregler for sikker håndtering

Anbefalinger

- Foranstaltninger til at undgå brand og aerosol- og støvdannelse

Anvend lokal og almen ventilation. Undgåelse af tændkilder. Holdes væk fra antændelseskilder - Rygning forbudt. Træf foranstaltninger mod statisk elektricitet. Må kun bruges på steder med god ventilation. På grund af eksplosionsfare skal damplækage i kældre, røgkanaler og kanaler forhindres. Beholder og modtageudstyr jordforbindes/potentialudlignes. Anvend eksplosionssikkert elektrisk/ventilations-/lys-/udstyr. Anvend kun værktøj, som ikke frembringer gnister.

- Specifikke anvisninger/oplysninger

Det kan navnlig forventes, at der er brændbare stoffer eller blandinger til stede i områder, som ikke ventileres, f.eks. uventilerede underjordiske områder som gruber, kanaler og skakte. Dampe er tungere end luft, spredes langs gulvet og kan danne eksplosive blandinger med luft. Dampe kan danne eksplosive blandinger med luft.

Råd om generel hygiejne

Vask hænder efter håndtering. Undlad at spise, drikke og ryge i arbejdsområderne. Tag forurenet tøj og personlige værnemidler af, inden man bevæger sig ind i et område, hvor der spises. Opbevar aldrig mad eller drikkevarer i nærheden af kemikalier. Opbevar aldrig kemikalier i beholdere, der som regel anvendes til mad og drikkevarer. Må ikke opbevares sammen med fødevarer, drikkevarer og foderstoffer.

7.2 Betingelser for sikker opbevaring, herunder eventuel uforenelighed

Håndtering af forbundne risici

- Eksplosiv atmosfære

Emballagen skal holdes tæt lukket og opbevares på et godt ventileret sted. Anvend lokal og almen ventilation. Opbevares køligt. Beskyttes mod sollys.

- Brandfare

Holdes væk fra antændelseskilder - Rygning forbudt. Holdes væk fra varme/gnister/åben ild/varme overflader. Rygning forbudt. Træf foranstaltninger mod statisk elektricitet. Beskyttes mod sollys.

- Krav til ventilation

Anvend lokal og almen ventilation. Beholder og modtageudstyr jordforbindes/potentialudlignes.

- Egnet emballage

Det er kun tilladt at benytte emballager, som er godkendt (f.eks. iht. ADR).

7.3 Særlige anvendelser

Se punkt 16 for en generel oversigt.

PUNKT 8: Eksponeringskontrol/personlige værnemidler

8.1 Kontrolparametre

OEL-værdier (grænseværdier for erhvervsmæssig eksponering)
disse oplysninger foreligger ikke

Værdier for menneskets sundhed

Relevante DNEL- og andre tærskelværdier

Endpunkt	Tærskelværdi	Beskyttelsesmål, eksponeringsvej	Anvendt i	Eksponeringstid
DNEL	31,1 mg/m³	menneske, indånding	industriarbejder	kroniske systemiske virkninger
DNEL	8,89 mg/kg kropsvægt/dag	menneske, dermal	industriarbejder	kroniske systemiske virkninger
DNEL	185,8 µg/cm²	menneske, dermal	industriarbejder	akutte lokale virkninger

Relevante DNEL'er for blandingens komponenter

Stoffets navn	CAS-nr.	Endpunkt	Tærskelværdi	Beskyttelsesmål, eksponeringsvej	Anvendt i	Eksponeringstid
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	DNEL	66,7 mg/m³	menneske, indånding	industriarbejder	kroniske systemiske virkninger
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	DNEL	9,5 mg/kg kropsvægt/dag	menneske, dermal	industriarbejder	kroniske systemiske virkninger
alpha-Pinene	80-56-8	DNEL	3,8 mg/m³	menneske, indånding	industriarbejder	kroniske systemiske virkninger
alpha-Pinene	80-56-8	DNEL	0,542 mg/kg kropsvægt/dag	menneske, dermal	industriarbejder	kroniske systemiske virkninger

Relevante DNEL'er for blandingens komponenter

Stoffets navn	CAS-nr.	End-punkt	Tærskel-værdi	Beskyttelses-mål, eksponeringsvej	Anvendt i	Eksponeringstid
Linalool	78-70-6	DNEL	2,8 mg/m³	menneske, indånding	industriarbejder	kroniske systemiske virkninger
Linalool	78-70-6	DNEL	16,5 mg/m³	menneske, indånding	industriarbejder	akutte systemiske virkninger
Linalool	78-70-6	DNEL	2,5 mg/kg krop-svægt/dag	menneske, dermal	industriarbejder	kroniske systemiske virkninger
Linalool	78-70-6	DNEL	5 mg/kg krop-svægt/dag	menneske, dermal	industriarbejder	akutte systemiske virkninger
3,7,7-trimethylbicyclo[4.1.0]hept-3-en	13466-78-9	DNEL	5,69 mg/m³	menneske, indånding	industriarbejder	kroniske systemiske virkninger
3,7,7-trimethylbicyclo[4.1.0]hept-3-en	13466-78-9	DNEL	0,8 mg/kg krop-svægt/dag	menneske, dermal	industriarbejder	kroniske systemiske virkninger

Miljøværdier

Relevante PNEC- og andre tærskelværdier

End-punkt	Tærskelværdi	Organisme	Delmiljø	Eksponeringstid
PNEC	5,4 µg/l	vandorganismer	ferskvand	kortvarigt (enkelt tilfælde)
PNEC	0,54 µg/l	vandorganismer	havvand	kortvarigt (enkelt tilfælde)
PNEC	2,1 mg/l	vandorganismer	spildevandsbehandlingsanlæg (STP)	kortvarigt (enkelt tilfælde)
PNEC	1,3 mg/kg	vandorganismer	ferskvandssediment	kortvarigt (enkelt tilfælde)
PNEC	0,13 mg/kg	vandorganismer	havvandssediment	kortvarigt (enkelt tilfælde)
PNEC	0,261 mg/kg	jordorganismer	jord	kortvarigt (enkelt tilfælde)

Relevante PNEC'er for blandingens komponenter

Stoffets navn	CAS-nr.	End-punkt	Tærskel-værdi	Organisme	Delmiljø	Eksponeringstid
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	PNEC	14 µg/l	vandorganismer	ferskvand	kortvarigt (enkelt tilfælde)
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	PNEC	1,4 µg/l	vandorganismer	havvand	kortvarigt (enkelt tilfælde)
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	PNEC	1,8 mg/l	vandorganismer	spildevandsbehandlingsanlæg (STP)	kortvarigt (enkelt tilfælde)
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	PNEC	3,85 mg/kg	vandorganismer	ferskvandssediment	kortvarigt (enkelt tilfælde)

Relevante PNEC'er for blandingens komponenter

Stoffets navn	CAS-nr.	End-punkt	Tærskel-værdi	Organisme	Delmiljø	Eksponeringstid
(R)-p-mentha-1,8-di-en	5989-27-5 68606-81-5	PNEC	0,385 mg/kg	vandorganismer	havvandssediment	kortvarigt (enkelt tilfælde)
(R)-p-mentha-1,8-di-en	5989-27-5 68606-81-5	PNEC	0,763 mg/kg	jordorganismer	jord	kortvarigt (enkelt tilfælde)
alpha-Pinene	80-56-8	PNEC	0,606 µg/l	vandorganismer	ferskvand	kortvarigt (enkelt tilfælde)
alpha-Pinene	80-56-8	PNEC	0,061 µg/l	vandorganismer	havvand	kortvarigt (enkelt tilfælde)
alpha-Pinene	80-56-8	PNEC	0,2 mg/l	vandorganismer	spildevandsbe-handlingsanlæg (STP)	kortvarigt (enkelt tilfælde)
alpha-Pinene	80-56-8	PNEC	157 µg/kg	vandorganismer	ferskvandssedi-ment	kortvarigt (enkelt tilfælde)
alpha-Pinene	80-56-8	PNEC	15,7 µg/kg	vandorganismer	havvandssediment	kortvarigt (enkelt tilfælde)
alpha-Pinene	80-56-8	PNEC	31,7 µg/kg	jordorganismer	jord	kortvarigt (enkelt tilfælde)
Linalool	78-70-6	PNEC	0,2 mg/l	vandorganismer	ferskvand	kortvarigt (enkelt tilfælde)
Linalool	78-70-6	PNEC	0,02 mg/l	vandorganismer	havvand	kortvarigt (enkelt tilfælde)
Linalool	78-70-6	PNEC	10 mg/l	vandorganismer	spildevandsbe-handlingsanlæg (STP)	kortvarigt (enkelt tilfælde)
Linalool	78-70-6	PNEC	2,22 mg/kg	vandorganismer	ferskvandssedi-ment	kortvarigt (enkelt tilfælde)
Linalool	78-70-6	PNEC	0,222 mg/kg	vandorganismer	havvandssediment	kortvarigt (enkelt tilfælde)
Linalool	78-70-6	PNEC	0,327 mg/kg	jordorganismer	jord	kortvarigt (enkelt tilfælde)
3,7,7-trimethylbi-cyclo[4.1.0]hept-3-en	13466-78-9	PNEC	0,44 µg/l	vandorganismer	ferskvand	kortvarigt (enkelt tilfælde)
3,7,7-trimethylbi-cyclo[4.1.0]hept-3-en	13466-78-9	PNEC	0,044 µg/l	vandorganismer	havvand	kortvarigt (enkelt tilfælde)
3,7,7-trimethylbi-cyclo[4.1.0]hept-3-en	13466-78-9	PNEC	3,26 mg/l	vandorganismer	spildevandsbe-handlingsanlæg (STP)	kortvarigt (enkelt tilfælde)
3,7,7-trimethylbi-cyclo[4.1.0]hept-3-en	13466-78-9	PNEC	104 µg/kg	vandorganismer	ferskvandssedi-ment	kortvarigt (enkelt tilfælde)
3,7,7-trimethylbi-cyclo[4.1.0]hept-3-en	13466-78-9	PNEC	10,4 µg/kg	vandorganismer	havvandssediment	kortvarigt (enkelt tilfælde)

Relevante PNEC'er for blandingens komponenter						
Stoffets navn	**CAS-nr.**	**End-punkt**	**Tærskel-værdi**	**Organisme**	**Delmiljø**	**Eksponeringstid**
3,7,7-trimethylbi-cyclo[4.1.0]hept-3-en	13466-78-9	PNEC	20,8 $^{\mu g}/_{kg}$	jordorganismer	jord	kortvarigt (enkelt tilfælde)

8.2 Eksponeringskontrol

Egnede foranstaltninger til eksponeringskontrol

Almen ventilation.

Individuelle beskyttelsesforanstaltninger (personlige værnemidler)

Beskyttelse af øjne/ansigt

Brug beskyttelsesbriller/ansigtsskærm.

Beskyttelse af hud

- Beskyttelse af hænder

Brug egnede beskyttelseshandsker. Kemiske beskyttelseshandsker, som er testet i henhold til EN 374, er egnede. Kontroller tæthed/gennemtrængelighed før anvendelse. Hvis handskerne skal bruges igen, skal de rengøres, inden de tages af, og luftes grundigt. Til specielle formål anbefales det at kontrollere beskyttelseshandskernes modstands-dygtighed over for kemikaler i samarbejde med producenten af disse handsker.

- Materialetype

NBR: akrylonitrilbutadiengummi

- Materialetykkelse

> 0,7 mm

- Gennemtrængningstid af handskematerialet

>10 minutter (permeation: trin 1)

- Andre beskyttelsesforanstaltninger

Tillad perioder til hudregenerering. Forebyggende hudbeskyttelse (beskyttende creme/salve) anbefales. Vask hænderne grundigt efter brug.

Åndedrætsværn

Ved utilstrækkelig udluftning anvendes åndedrætsværn.
Halvmaske med filter (EN 149). Type: A (mod organiske gasser og dampe med et kogepunkt på > 65 °C, farvekode: brun).

Foranstaltninger til begrænsning af eksponering af miljøet

Skal indesluttes forsvarligt for at undgå miljøforurening. Holdes væk fra afløb, overfladevand og grundvand.

PUNKT 9: Fysisk-kemiske egenskaber

9.1 Oplysninger om grundlæggende fysiske og kemiske egenskaber

Fysisk tilstand	flydende
Farve	orange
Lugt	karakteristisk
Smeltepunkt/frysepunkt	<-25 °C

Kogepunkt eller begyndelseskogepunkt og kogepunktsinterval	ikke bestemt
Antændelighed	brandfarlig væske i henhold til GHS-kriterier
Øvre og nedre eksplosionsgrænse	ikke bestemt
Flammepunkt	53,4 °C
Selvantændelsestemperatur	235 °C ved 1.016 hPa (ECHA)
Dekomponeringstemperatur	ikke relevant
pH-værdi	ikke bestemt
Kinematisk viskositet	1,17 $^{mm^2}/_{s}$ ved 20 °C

Opløselighed(er)

Vandopløselighed	1.767 $^{mg}/_{l}$ ved 25 °C

Fordelingskoefficient

Fordelingskoefficient n-oktanol/vand (logværdi)	2,78 – 4,88 (ECHA)

Damptryk	186,4 Pa ved 25 °C

Massefylde og/eller relativ massefylde

Massefylde	0,846 $^{g}/_{cm^3}$ ved 20 °C
Relativ dampmassefylde	oplysninger om denne egenskab foreligger ikke

Partikelegenskaber	ikke relevant (flydende)

9.2 Andre oplysninger

Oplysninger vedrørende fysiske fareklasser	der foreligger ingen yderligere oplysninger

Andre sikkerhedskarakteristika

Blandbarhed	Fuldstændigt blandbar med vand.
Temperaturklasse (EU, iht. ATEX)	T3 (maksimalt tilladte overfladetemperatur på udstyret: 200° C)

PUNKT 10: Stabilitet og reaktivitet

10.1 Reaktivitet

Vedrørende materialer, der skal undgås: se nedenstående "Forhold, der skal undgås" og "Materialer, der skal undgås". Det er et reaktivt stof. Blandingen indeholder reaktivt stof/reaktive stoffer. Risiko for tænding.

Ved opvarmning:

Risiko for tænding

10.2 Kemisk stabilitet

Se nedenstående "Forhold, der skal undgås".

10.3 Risiko for farlige reaktioner

Ingen kendte farlige reaktioner.

10.4 Forhold, der skal undgås

Holdes væk fra varme/gnister/åben ild/varme overflader. Rygning forbudt.

Anbefalinger til hindring af brand eller eksplosion

Anvend eksplosionssikkert elektrisk/ventilations-/lys-/udstyr. Anvend kun værktøj, som ikke frembringer gnister. Træf foranstaltninger mod statisk elektricitet.

10.5 Materialer, der skal undgås

Brandnærende

10.6 Farlige nedbrydningsprodukter

Farlige nedbrydningsprodukter, der med rimelighed kan forventes som følge af anvendelse, opbevaring, spild og opvarmning, er ikke kendte. Farlige forbrændingsprodukter: se punkt 5.

PUNKT 11: Toksikologiske oplysninger

11.1 Oplysninger om fareklasser som defineret i forordning (EF) nr. 1272/2008

Klassificering i henhold til GHS (1272/2008/EF, CLP)

Akut toksicitet

Klassificeringskriterierne for denne fareklasse er ikke opfyldt.

Hudætsning/hudirritation

Forårsager hudirritation.

Alvorlige øjenskader/øjenirritation

Klassificeres ikke som fremkaldende alvorlig øjenskade eller øjenirritation.

Luftvejssensibilisering eller hudsensibilisering

Kan forårsage allergisk hudreaktion.

Kimcellemutagenicitet

Klassificeres ikke som kimcellemutagen.

Carcinogenicitet

Klassificeres ikke som carcinogen.

Reproduktionstoksicitet

Klassificeres ikke som et reproduktionstoksisk stof.

Specifik målorgantoksicitet, enkel eksponering

Klassificeres ikke som specifikt målorgantoksisk (enkel eksponering).

Specifik målorgantoksicitet, gentagen eksponering

Klassificeres ikke som specifikt målorgantoksisk (gentagen eksponering).

Aspirationsfare

Kan være livsfarligt, hvis det indtages og kommer i luftvejene.

11.2 Oplysninger om andre farer

Der foreligger ingen yderligere oplysninger.

PUNKT 12: Miljøoplysninger

12.1 Toksicitet

Giftig for vandlevende organismer, med langvarige virkninger.

Toksicitet for vandmiljøet (akut)

Endpunkt	Værdi	Art	Eksponeringstid
LL50	5,65 $^{mg}/_{l}$	fisk	96 h
EL50	1,4 $^{mg}/_{l}$	vandinvertebrater	24 h

12.2 Persistens og nedbrydelighed

Bionedbrydning

Stoffet er let bionedbrydeligt.

Nedbrydelighed af blandingens komponenter

Stoffets navn	CAS-nr.	Proces	Halveringstid	Tid	Metode	Kilde
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	produktion af kuldioxid	58,8 %	14 d		ECHA
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5	iltsvind	80 %	28 d		ECHA
Myrcene	123-35-3	iltsvind	76 %	28 d		ECHA
alpha-Pinene	80-56-8	iltsvind	68 %	28 d		ECHA
Linalool	78-70-6	iltsvind	40,9 %	5 d		ECHA

12.3 Bioakkumuleringspotentiale

Data foreligger ikke.

n-oktanol/vand (log KOW)	2,78 – 4,88 (ECHA)
BCF	32 – 156 (ECHA)

Bioakkumuleringspotentiale hos blandingens komponenter

Stoffets navn	CAS-nr.	BCF	Log KOW	BOD5/COD
(R)-p-mentha-1,8-dien	5989-27-5 68606-81-5		4,38 (pH-værdi: 7,2, 37 °C)	
Myrcene	123-35-3		4,82 (pH-værdi: ~6,5, 30 °C)	

Bioakkumuleringspotentiale hos blandingens komponenter

Stoffets navn	CAS-nr.	BCF	Log KOW	BOD5/COD
Linalool	78-70-6		2,9 (pH-værdi: 7, 20 °C)	
3,7,7-trimethylbicyclo[4.1.0]hept-3-en	13466-78-9		4,38 (pH-værdi: 7,2, 37 °C)	

12.4 Mobilitet i jord

Data foreligger ikke.

12.5 Resultater af PBT- og vPvB-vurdering

Ifølge resultaterne af vurderingen af dette stof er det ikke et PBT- eller et vPvB-stof.

12.6 Hormonforstyrrende egenskaber

Oplysninger om denne egenskab foreligger ikke.

12.7 Andre negative virkninger

Data foreligger ikke.

PUNKT 13: Bortskaffelse

13.1 Metoder til affaldsbehandling

Oplysninger med relevans for affaldsbehandling

Genvinding eller regenerering af opløsningsmidler.

Oplysninger med relevans for udledning af spildevandet

Må ikke tømmes i kloakafløb. Undgå udledning til miljøet. Se særlig vejledning/leverandørbrugsanvisning.

Affaldsbehandling for beholdere/emballage

Det er farligt affald; det er kun tilladt at benytte emballager, som er godkendt (f.eks. iht. ADR). Helt tømt emballage kan genanvendes. Forurenet emballage skal håndteres på samme måde som stoffet selv.

Relevante bestemmelser om affald

Beslutning 2000/532/EF om listen over affald

Produkt, Produktrest: 07 06 99 andet affald, ikke andetsteds specificeret
Emballager: 15 01 10* Emballage, som indeholder rester af eller er forurenet med farlige stoffer.
Helt tømt emballage kan genanvendes.

Bemærkninger

Tag hensyn til gældende nationale eller regionale bestemmelser. Affald skal sorteres i kategorier, som kan håndteres særskilt af de lokale eller nationale affaldshåndteringsanlæg.

PUNKT 14: Transportoplysninger

14.1 UN-nummer eller ID-nummer

ADR/RID	UN 1197
IMDG-Code	UN 1197
ICAO-TI	UN 1197

14.2 UN-forsendelsesbetegnelse (UN proper shipping name)

ADR/RID	EKSTRAKTER, FLYDENDE
IMDG-Code	EXTRACTS, LIQUID

ICAO-TI	Extracts, liquid

14.3 Transportfareklasse(r)

ADR/RID	3
IMDG-Code	3
ICAO-TI	3

14.4 Emballagegruppe

ADR/RID	III
IMDG-Code	III
ICAO-TI	III

14.5 Miljøfarer farligt for vandmiljøet

14.6 Særlige forsigtighedsregler for brugeren

Bestemmelserne for farligt gods (ADR) skal overholdes på området.

14.7 Bulktransport til søs i henhold til IMO-instrumenter

Det er ikke hensigten at gennemføre bulktransport.

Oplysninger om hver af FN-modelbestemmelserne (UN Model Regulations)

Den konvention om international transport af farligt gods ad vej (ADR) - Yderligere information

Angivelser i transportdokumentet	UN1197, EKSTRAKTER, FLYDENDE, 3, III, (D/E), miljøfarlig
Klassifikationskode	F1
Faremærkat(er)	3, fisk og træ

Miljøfarer	ja (farligt for vandmiljøet)
Særlige bestemmelser (SB)	601
Undtagne mængder (UM)	E1
Begrænsede mængder (BM)	5 L
Transportkategori (TK)	3
Tunnelrestriktionskode (TRK)	D/E
Farenummer	30

Reglement for international befordring af farligt gods med jernbane (RID) - Yderligere information

Klassifikationskode	F1
Faremærkat(er)	3, fisk og træ

Miljøfarer	ja (farlig for vand)
Særlige bestemmelser (SB)	601
Undtagne mængder (UM)	E1

Begrænsede mængder (BM)	5 L
Transportkategori (TK)	3
Farenummer	30

International Maritime Dangerous Goods Code (IMDG-koden) - Yderligere information

Angivelser i transportdokument (shipper's declaration)	UN1197, EKSTRAKTER, FLYDENDE, ((R)-p-mentha-1,8-dien), 3, III, 53,4°C c.c., MARINE POLLUTANT
Marine pollutant	ja (farligt for vandmiljøet)
Faremærkat(er)	3, fisk og træ

Særlige bestemmelser (SB)	223, 955
Undtagne mængder (UM)	E1
Begrænsede mængder (BM)	5 L
EmS	F-E, S-D
Stuvningskategori	A

Den Internationale Organisation for Civil Luftfart (ICAO-IATA/DGR) - Yderligere information

Angivelser i transportdokument (shipper's declaration)	UN1197, Ekstrakter, flydende, 3, III
Miljøfarer	ja (farligt for vandmiljøet)
Faremærkat(er)	3

Særlige bestemmelser (SB)	A3
Undtagne mængder (UM)	E1
Begrænsede mængder (BM)	10 L

PUNKT 15: Oplysninger om regulering

15.1 Særlige bestemmelser/særlig lovgivning for stoffet eller blandingen med hensyn til sikkerhed, sundhed og miljø

Relevante bestemmelser fra Den europæiske Union (EU)

Fortegnelse over stoffer, der kræver godkendelse (REACH, bilag XIV) / SVHC - kandidatliste

ikke registreret

Seveso-direktiv

2012/18/EU (Seveso III)

Nr.	Farligt stof/farekategorier	Tærskelmængde (tons) for anvendelse af kolonne 2-krav	kolonne 3-krav	Anv.
E2	miljøfarer (farlig for vandmiljøet, kat. 2)	200	500	57)
P5c	brandfarlige væsker (kat. 2, 3)	5.000	50.000	51)

Anmærkning
51) brandfarlige væsker, kategori 2 eller 3, ikke omfattet af P5a og P5b
57) farlig for vandmiljøet i kategori Akut 2 eller Kronisk 2

Forordning om persistente organiske miljøgifte

Ikke registreret.

Nationale fortegnelser

Land	Fortegnelse	Status
CA	DSL	stoffet er registreret
EU	REACH Reg.	stoffet er registreret
US	TSCA	substance is listed as "ACTIVE"
AU	AIIC	stoffet er registreret
CN	IECSC	stoffet er registreret
KR	KECI	stoffet er registreret
MX	INSQ	stoffet er registreret
NZ	NZIoC	stoffet er registreret
PH	PICCS	stoffet er registreret
TR	CICR	stoffet er registreret
TW	TCSI	stoffet er registreret
EU	ECSI	stoffet er registreret

Figurtekst

AIIC	Australian Inventory of Industrial Chemicals
CICR	Chemical Inventory and Control Regulation
DSL	Domestic Substances List (DSL)
ECSI	EF-fortegnelse over stoffer (EINECS, ELINCS, NLP)
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China
INSQ	National Inventory of Chemical Substances
KECI	Korea Existing Chemicals Inventory
NZIoC	New Zealand Inventory of Chemicals
PICCS	Philippine Inventory of Chemicals and Chemical Substances (PICCS)
REACH Reg.	REACH registrerede stoffer
TCSI	Taiwan Chemical Substance Inventory
TSCA	Toxic Substance Control Act

15.2 Kemikaliesikkerhedsvurdering

En kemikaliesikkerhedsvurdering er blevet gennemført for dette stof.

PUNKT 16: Andre oplysninger

Angivelse af ændringer (revideret sikkerhedsdatablad)

Punkt	Forrige registrering (tekst/værdi)	Aktuel registrering (tekst/værdi)	Sikkerhedsrelevant
1.1	Identifikation af stoffet: Orange Oil	Identifikation af stoffet: Orange Oil sweet Brasil	ja
2.2		- Sikkerhedssætninger: ændring i registrering (tabel)	ja
3.1	Stoffets navn: Orange Oil (UVCB)	Stoffets navn: Orange Oil sweet Brasil (UVCB)	ja

Punkt	Forrige registrering (tekst/værdi)	Aktuel registrering (tekst/værdi)	Sikkerhedsrelevant
8.1	Kontrolparametre: Disse oplysninger foreligger ikke.	Kontrolparametre: OEL-værdier (grænseværdier for erhvervsmæssig eksponering) disse oplysninger foreligger ikke	ja
12.5	Resultater af PBT- og vPvB-vurdering: Data foreligger ikke.	Resultater af PBT- og vPvB-vurdering: Ifølge resultaterne af vurderingen af dette stof er det ikke et PBT- eller et vPvB-stof.	ja
12.6	Hormonforstyrrende egenskaber: Ikke registreret.	Hormonforstyrrende egenskaber: Oplysninger om denne egenskab foreligger ikke.	ja
14.1	ADR/RID: UN 1169	ADR/RID: UN 1197	ja
14.1	IMDG-Code: UN 1169	IMDG-Code: UN 1197	ja
14.1	ICAO-TI: UN 1169	ICAO-TI: UN 1197	ja
14.2	ADR/RID: AROMASTOFFER, FLYDENDE	ADR/RID: EKSTRAKTER, FLYDENDE	ja
14.2	IMDG-Code: EXTRACTS, AROMATIC, LIQUID	IMDG-Code: EXTRACTS, LIQUID	ja
14.2	ICAO-TI: Extracts, aromatic, liquid	ICAO-TI: Extracts, liquid	ja
14.7	Angivelser i transportdokumentet: UN1169, AROMASTOFFER, FLYDENDE, 3, III, (D/E), miljøfarlig	Angivelser i transportdokumentet: UN1197, EKSTRAKTER, FLYDENDE, 3, III, (D/E), miljøfarlig	ja
14.7	Angivelser i transportdokument (shipper's declaration): UN1169, AROMASTOFFER, FLYDENDE, ((R)-p-mentha-1,8-dien), 3, III, 53,4°C c.c., MARINE POLLUTANT	Angivelser i transportdokument (shipper's declaration): UN1197, EKSTRAKTER, FLYDENDE, ((R)-p-mentha-1,8-dien), 3, III, 53,4°C c.c., MARINE POLLUTANT	ja
14.7	Angivelser i transportdokument (shipper's declaration): UN1169, Aromastoffer, flydende, 3, III	Angivelser i transportdokument (shipper's declaration): UN1197, Ekstrakter, flydende, 3, III	ja
15.1		Nationale fortegnelser: ændring i registrering (tabel)	ja

Forkortelser og akronymer

Fork.	Forklaring af anvendte forkortelser
ADR	Accord relatif au transport international des marchandises dangereuses par route (Den overenskomst om international transport af farligt gods ad vej)
BCF	Biokoncentrationsfaktor
BOD	Biokemisk iltforbrug
CAS	Chemical Abstract Service (database med en fortegnelse over kemiske forbindelser)
CLP	Forordning (EF) nr. 1272/2008 om klassificering, mærkning og emballering af stoffer og blandinger
COD	Kemisk Iltforbrug
DGR	Dangerous Goods Regulations (fordning om farligt gods, se IATA/DGR)

Fork.	Forklaring af anvendte forkortelser
DNEL	Derived No-Effect Level (afledt nuleffektniveau)
EF-nr.	EF-fortegnelsen (EINECS, ELINCS og NLP-fortegnelsen) er kilden til det syv-cifrede EF-nummer, en identifikator for markedsførte kemiske stoffer inden for EU (Den europæiske Union)
EINECS	European Inventory of Existing Commercial Chemical Substances (den europæiske fortegnelse over markedsførte kemiske stoffer)
EL50	Effective Loading 50 %: EL50 svarer til den belastningsrate, der kræves for at skabe en respons i 50 % af testorganismerne
ELINCS	European List of Notified Chemical Substances (den europæiske liste over anmeldte stoffer)
EmS	Tidsplan i Nødstilfælde
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" "Globalt Harmoniseret System til Klassificering og Mærkning af Kemikalier", udviklet af FN
IATA	International Air Transport Association (den internationale organisation for luftfart)
IATA/DGR	Forordning om transport af farligt gods (DGR) via lufttransport (IATA)
ICAO	International Civil Aviation Organization (den internationale organisation for civil luftfart)
ICAO-TI	Tekniske instrukser for sikker lufttransport af farligt gods
IMDG	International Maritime Dangerous Goods Code (den internationale kode for søtransport af farligt gods)
IMDG-Code	International Maritime Dangerous Goods Code
LL50	Lethal Loading 50 %: LL50 svarer til den belastning, der afføder 50 % dødelighed
log KOW	n-Oktanol/vand
NLP	No-Longer Polymer
PBT	Persistent, Bioakkumulerende og Toksisk
PNEC	Predicted No-Effect Concentration (beregnet nuleffektkoncentration)
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (registrering, vurdering og godkendelse af samt begrænsninger for kemikalier)
RID	Règlement concernant le transport International ferroviaire des marchandises Dangereuses (forordning om international transport af farligt gods ad jernbane)
SVHC	Substance of Very High Concern (særligt problematisk stof)
vPvB	Very Persistent and very Bioaccumulative (meget persistent og meget bioakkumulativ)

Henvisninger til den vigtigste faglitteratur og de vigtigste datakilder

Forordning (EF) nr. 1272/2008 om klassificering, mærkning og emballering af stoffer og blandinger. Forordning (EF) nr. 1907/2006 (REACH), ændret ved 2020/878/EU.

Den konvention om international transport af farligt gods ad vej (ADR). Reglement for international befordring af farligt gods med jernbane (RID). International Maritime Dangerous Goods Code (IMDG-koden). Forordning om transport af farligt gods (DGR) via lufttransport (IATA).

Fortegnelse over de vigtigste sætninger (kode og fuldstændig ordlyd som beskrevet i punkt 2 og 3)

Kode	Tekst
H226	Brandfarlig væske og damp.
H304	Kan være livsfarligt, hvis det indtages og kommer i luftvejene.
H315	Forårsager hudirritation.
H317	Kan forårsage allergisk hudreaktion.
H411	Giftig for vandlevende organismer, med langvarige virkninger.

Ansvarsfraskrivelse

Disse oplysninger er baseret på vores nuværende viden. Dette SDS er udarbejdet for og gælder udelukkende for dette produkt.

ES FOR COMMUNICATION

Table of Contents

Substance Name: Orange oil

EC Number: 232-433-8

CAS Number: 8028-48-6

Registration Number:

Date of Generation/Revision: 2012-04-23

Author: Royal Haskoning

Reader guide to the appendix

The appendix to the exposure scenario describes how Orange oil 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 Orange oil. 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 use, you will find which uses 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 1: Title of the exposure scenario. Provides the relevant Environmental Release Categories (ERCs) and Process Categories (PROCs) for contributing scenarios, together with a description of the activities covered.

Section 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 Orange oil in any mixtures used
- The form of the mixture in which Orange oil is used

Most items listed in the subsection “Other operational conditions” are a refined description of the process category covered. NB: 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 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 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.

0. Good practices applicable to all worker ES

Generic organisational measures
- 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 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: Manufacturing stage; Manufacturing of Orange oil

1. Title of Exposure scenario	
Environment: * ENV1a Extraction of fruits/plant material and processing of oil/water emulsion * ENV1b Extraction of fruits/plant material and processing of oil/water emulsion * ENV2 Further refinement of essential oils	ERC 1
Worker	
Manufacture in closed process, no likelihood of exposure	PROC 1
Manufacture in closed, continuous process with occasional controlled exposure	PROC 2
Manufacture in closed batch process (synthesis or formulation)	PROC 3
Manufacture in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Use as laboratory reagent	PROC 15

2. Conditions of use affecting exposure
2.1 Control of environmental exposure: ENV1a Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1) ENV1b Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1) ENV2 Further refinement of essential oils (ERC 1)
2.1.1 Control of environmental exposure: ENV1a Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1)
Amounts used
Daily amount per site <= 17.5 tonnes/day Annual amount per site <= 3.5E3 tonnes/year
Frequency and duration of use
Emission days / year = 200 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.2 Control of environmental exposure: ENV1b Extraction of fruits/plant material and processing of oil/water emulsion (ERC 1)
Amounts used
Daily amount per site <= 0.632 tonnes/day Annual amount per site <= 126.4 tonnes/year
Frequency and duration of use

Emission days / year = 200 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

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

Amounts used

Daily amount per site <= 0.632 tonnes/day

Annual amount per site <= 230.7 tonnes/year

Frequency and duration of use

Emission days / year = 365 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.2 Control of workers exposure for Manufacture in closed process, no likelihood of exposure **(PROC 1)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use

Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2)

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.3 Control of workers exposure for Manufacture in closed, continuous process with occasional controlled exposure **(PROC 2)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2)

Assumes activities are at room temperature.

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of liquid products - falling liquids
*Splash loading
*Avoid carrying out operation for more than 0.5 hour
* For each use event, covers use amounts up to 0.1-1 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.4 Control of workers exposure for Manufacture in closed batch process (synthesis or formulation) **(PROC 3)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2)

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Undertake operation under enclosed conditions.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.5 Control of workers exposure for Manufacture in batch and other process (synthesis) where opportunity for exposure arises **(PROC 4)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently).

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Use in batch and other process (synthesis) where opportunity for exposure arises.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.6 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities **(PROC 8b)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Transfer of liquid products - falling liquids
*Submerged loading
*For each use event, covers use amounts up to 100-1000 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.7 Control of workers exposure for Use as laboratory reagent **(PROC 15)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: One hand face only (240 cm2)

Assumes activities are at room temperature.

Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation).
*Open surface < 0.1 m².

Transfer of liquid products - falling liquids

*Splash loading. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to 0.1-1 l/minute.
*Submerged loading. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to <0.1 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

3. Exposure estimation and reference to its source

The environmental exposure estimates were calculated according to EUSES version 2.1.2.
Degradation in the STP was calculated according to first-order kinetics.

Environment
ENV1a Extraction of fruits/plant material and processing of oil/water emulsion

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	0	Site-specific information
Air	210	Site-specific information
Soil	1.75	ERC 1

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	5.96E-4 mg/L	**0.11**
Freshwater (sediment)	0.146 mg/kg dw	**0.112**
Marine water (pelagic)	4.91E-5 mg/L	**0.091**
Marine water (sediment)	0.012 mg/kg dw	**0.092**
Effluent	0 mg/L	**0**
Agricultural soil	0.003 mg/kg dw	**0.011**

Environment
ENV1b Extraction of fruits/plant material and processing of oil/water emulsion

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	Site-specific information
Air	7.584	Site-specific information
Soil	0.063	ERC 1

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**

Agricultural soil	0.261 mg/kg dw	**1**

Environment ENV2 Further refinement of essential oils		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	Site-specific information
Air	7.584	Site-specific information
Soil	0.063	ERC 1

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Risk characterisation for man via the environment ENV1a Extraction of fruits/plant material and processing of oil/water emulsion
Inhalation: RCR = 0.004 Oral: RCR = 2.154E-4
Risk characterisation for man via the environment ENV1b Extraction of fruits/plant material and processing of oil/water emulsion
Inhalation: RCR = 2.041E-4 Oral: RCR = 8.114E-4
Risk characterisation for man via the environment ENV2 Further refinement of essential oils
Inhalation: RCR = 3.181E-4 Oral: RCR = 0.001

Worker exposure				
Long-term, systemic				
Contributing scenario	**Inhalation**	**Dermal**	**Combined routes**	**Exposure estimation Method**
Manufacture in closed process, no likelihood of exposure (PROC 1)	Exposure: 1.5 mg/m³ RCR: 0.048	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.049	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: High level containment) Derm: Extended TRA workers

Manufacture in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 1.6 mg/m³ RCR: 0.051	Exposure: 0.027 mg/kg bw/day RCR: 0.003	RCR: 0.055	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: High level containment) Derm: Extended TRA workers
Manufacture in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 15 mg/m³ RCR: 0.482	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.483	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: Medium level containment) Derm: Extended TRA workers
Manufacture in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 6.1 mg/m³ RCR: 0.196	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.212	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: Low level containment, general ventilation) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	Exposure: 18 mg/m³ RCR: 0.579	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.594	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: General ventilation) Derm: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 14 mg/m³ RCR: 0.45	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.451	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. No RMM) Derm: Extended TRA workers

Acute systemic
Not required as no hazard identified

Local effects via inhalation route
Not required as no hazard identified

Local effects via dermal route

A qualitative approach was used to assess the risk of sensitization in accordance with REACH Guidance R.8 (moderate hazard level). The use of gloves and generic organisational measures were proposed as Risk Management Measures to control the risk. Residual exposure was quantitatively estimated and assessed.			
Contributing scenario	**Acute**	**Long term**	**Exposure estimation Method**
Manufacture in closed process, no likelihood of exposure (PROC 1)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Manufacture in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 0.008 mg/cm² RCR: 0.043	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Manufacture in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Manufacture in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use as laboratory reagent (PROC 15)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)

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

Environment

The daily amount per site as mentioned in section 2.1 is the maximum amount (kg/day) that may be safely used, taking into account the default operational conditions as specified in section 2.1 and the release fractions as specified in section 3. This amount is defined as M_{Safe}.

To evaluate the compliance of specific compounding sites, the site-specific substance use rate (M_{Site}) and days emitting ($T_{Emission, Site}$), onsite and offsite emission controls and subsequent total substance emission Reduction Efficiency ($RE_{Total, Site} = 1 - [(1 - RE_{Onsite, Site}) \times (1 - RE_{Offsite, Site})]$), sewage treatment plant effluent flow rate ($G_{Effluent, Site}$) and receiving water dilution factor (q_{Site}) need to be known.

It is simpler and thus may be preferable to some users to compare M_{Site} with M_{Safe}. Adequate control of risk exists if the following conditions are met: [$RE_{Total, Site} \geq RE_{Total, SpERC}$, $G_{Effluent, Site} \geq G_{Effluent, SpERC}$, and $q_{Site} \geq q_{SpERC}$] and $M_{Safe} \geq M_{Site}$.

In case the above comparison does not show safe use, the following scaling possibilities are advised:

- The risk is driven by soil. As a default it is assumed that STP sludge is applied on agricultural soil. However this may not always be the case. If the STP sludge is not applied to soil, the RCR for agricultural soil will decrease significantly and therefore the amount that may be used will increase.
- When STP sludge is not applied to soil, the risk will be driven by surface water and sediment. The RCR for these protection targets is lower and therefore the volume can be increased with a factor of approximately 1.7 assuming all other conditions stay equal. If the volume is then not yet high enough, scaling based on municipal STP discharge rate and receiving river flow rate is advised.
- As mentioned in section 3, degradation in the STP has been calculated according to first-order kinetics in the model EUSES. This implies that the concentration in the effluent is proportional to the concentration in the influent and so the predicted concentration in effluent depends on the use volume. An alternative approach is to use Monod kinetics in EUSES. This can be applied for readily biodegradable substances in case: a) the release to the WWTP/STP is more or less continuous so the specific bacteria responsible for biodegradation will be able to maintain themselves in the system and b) the total COD load remains within the specifications of the WWTP/STP. When this approach is applied, the substance concentration in the STP effluent is independent of the concentration in the influent and therefore the use volume, and will remain below 50 µg/l. This implies that under these circumstances M_{safe} is theoretically unlimited.

Human health

A DU works within the boundaries of this ES if he fulfills the conditions of use set in section 2. Table 4.1 provides an overview of the assumed effectiveness for the different RMM. The DU can use this effectiveness estimation in order to assess if any deviating RMM will also provide safe use. This is done by multiplying the relevant RCR with the effectiveness of the RMM implemented at the workplace and dividing it by the effectiveness of the RMM listed in section 2. If the shift duration is greater than 8 hours per day, the long term systemic DNELs have to be adapted with the using the following equation, derived from the Brief and Scala model: DNEL Reduction Factor = (8 x hours worked in shift) x ((24 – hours worked in shift) / 16). This equation can not 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 with the adapted DNEL. If the RCR is smaller than 0.725 (1 - 0.275 or 1 - (Sum of all man through environment and generic consumer exposure), the downstreamuser works within the boundaries set by the ES.

Table 4.1 Effectiveness of risk management measures (RMM).

Risk management measure	Assumed effectiveness[1]		Source of effectiveness
	Inhalatory	Dermal	
High level containment - Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).	99.9%	99.9%	Advanced REACH tool (www.advancedreachtool.com).
Medium level containment - Undertake operation under enclosed conditions.	99%	33%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Low level containment - Put lids on containers immediately after use.	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.

[1] All effectiveness's listed are only valid if the RMM is properly designed, installed (if applicable), used and maintained.

Working outdoor / natural ventilation	30%	-	Advanced REACH tool (www.advancedreachtool.com)
General ventilation (mechanical)	50%	-	Advanced REACH tool (www.advancedreachtool.com).
Local exhaust ventilation, fixed capturing hood	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Local exhaust ventilation, other system	50%	17%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Laminar flow booth	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Respirator (Wear a full face respirator conforming to EN140 with Type A / P2 filter or better. APF >20))	95%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Respirator (Wear a respirator (half face mask) conforming to EN140 with Type A filter / P2 filter or better. APF >10)	90%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Reduction of duration of exposure			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 60 and <= 240 minutes per shift	40%	40%	
> 15 and <= 60 minutes per shift	80%	80%	
<= 15 minutes per shift	90%	80%	
Concentration of substance in mixture			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 5% and <= 25%	40%	75%	
> 1% and <= 5%	80%	95%	
<= 1%	90%	99%	

2. ES 2: Formulation (SU 3); Blending / Compounding

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

2. Conditions of use affecting exposure
2.1 Control of environmental exposure: Blending of mixtures and distribution (ERC 2) Compounding of fragrance oils (generic large/medium sites) (ERC 2) Compounding of fragrance oils (generic small sites) (ERC 2)
2.1.1 Control of environmental exposure: Blending of mixtures and distribution (ERC 2)
Amounts used
Daily amount per site <= 0.063 tonnes/day Annual amount per site <= 6.32 tonnes/year
Frequency and duration of use
Emission days / year = 100 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil

2.1.2 Control of environmental exposure: Compounding of fragrance oils (generic large/medium sites) **(ERC 2)**
Amounts used
Daily amount per site <= 0.632 tonnes/day Annual amount per site <= 158 tonnes/year
Frequency and duration of use
Emission days / year = 250 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.3 Control of environmental exposure: Compounding of fragrance oils (generic small sites) **(ERC 2)**
Amounts used
Daily amount per site <= 0.253 tonnes/day Annual amount per site <= 63.2 tonnes/year
Frequency and duration of use
Emission days / year = 250 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.2 Control of workers exposure for Formulation and distribution / compounding in closed system, no likelihood of exposure **(PROC 1)**
Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently). Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.3 Control of workers exposure for Formulation and distribution / compounding in closed, continuous process with occasional controlled exposure **(PROC 2)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently).

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of liquid products - falling liquids.
*Splash loading.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.4 Control of workers exposure for Formulation and distribution / compounding in closed batch process (synthesis or formulation) **(PROC 3)**
Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently). Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: One hand face only (240 cm2). Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces. * Open surface 1-3 m². Undertake operation under enclosed conditions.
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin.
2.5 Control of workers exposure for Formulation and distribution / compounding in batch and other process (synthesis) where opportunity for exposure arises **(PROC 4)**
Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently). Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: Two hands face (480 cm2). Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces. * Open surface 1-3 m².
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Put lids on containers immediately after use.

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.6 Control of workers exposure for Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **(PROC 5)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently).

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Transfer of liquid products - falling liquids.
*Submerged loading.
*Avoid carrying out operation for more than 1 hour.
*For each use event, covers use amounts up to 100-1000 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Activity with agitated surfaces: Put lids on containers immediately after use.

Transfer of liquid products: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.7 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **(PROC 8a)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid.

Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: Two hands (960 cm2). Transfer of liquid products - falling liquids. *Splash loading. *For each use event, covers use amounts up to 100-1000 l/minute. *Handling that reduces contact between product and adjacent air.*
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Put lids on containers immediately after use. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin.
2.8 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities **(PROC 8b)**
Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently) Liquid
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: Two hands face (480 cm2). Transfer of liquid products - falling liquids. *Submerged loading. *For each use event, covers use amounts up to 100-1000 l/minute. *Handling that reduces contact between product and adjacent air.*
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.9 Control of workers exposure for Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **(PROC 9)**

Product characteristics

Covers concentrations up to: 50%

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of liquid products - falling liquids.
*Splash loading.
*For each use event, covers use amounts up to 10-100 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.10 Control of workers exposure for Use as laboratory reagent **(PROC 15)**

Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Liquid

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2).

Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation)
*Open surface < 0.1 m²

Transfer of liquid products - falling liquids.
*Splash loading. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to 0.1-1 l/minute.
*Submerged loading. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to <0.1 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

3. Exposure estimation and reference to its source

The environmental exposure estimates were calculated according to EUSES version 2.1.2.
Degradation in the STP was calculated according to first-order kinetics.

Environment
Blending of mixtures and distribution

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	ERC - ERC 2
Air	1.58	ERC - ERC 2
Soil	0.006	ERC - ERC 2

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Compounding of fragrance oils (generic large/medium sites)

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (Compounding of fragrance oils - Compounding of fragrance oils medium/large compounder)
Air	15.8	SPERC (Compounding of fragrance oils - Compounding of fragrance oils medium/large compounder)
Soil	0.063	SPERC

		(Compounding of fragrance oils - Compounding of fragrance oils medium/large compounder)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment Compounding of fragrance oils (generic small sites)		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (Compounding of fragrance oils - Compounding of fragrance oils small compounder)
Air	6.32	SPERC (Compounding of fragrance oils - Compounding of fragrance oils small compounder)
Soil	0.025	SPERC (Compounding of fragrance oils - Compounding of fragrance oils small compounder)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Risk characterisation for man via the environment Blending of mixtures and distribution
Inhalation: RCR = 7.983E-5 Oral: RCR = 6.351E-4
Risk characterisation for man via the environment Compounding of fragrance oils (generic large/medium sites)
Inhalation: RCR = 4.262E-4 Oral: RCR = 9.009E-4
Risk characterisation for man via the environment Compounding of fragrance oils (generic small sites)
Inhalation: RCR = 2.101E-4

Oral: RCR = 8.976E-4

Worker exposure				
Long-term, systemic				
Contributing scenario	**Inhalation**	**Dermal**	**Combined routes**	**Exposure estimation Method**
Formulation and distribution / compounding in closed system, no likelihood of exposure (PROC 1)	Exposure: 1.5 mg/m³ RCR: 0.048	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.049	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: High level containment) Derm: Extended TRA workers
Formulation and distribution / compounding in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 1.6 mg/m³ RCR: 0.051	Exposure: 0.027 mg/kg bw/day RCR: 0.003	RCR: 0.055	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: High level containment) Derm: Extended TRA workers
Formulation and distribution / compounding in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 15 mg/m³ RCR: 0.482	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.483	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: Medium level containment) Derm: Extended TRA workers
Formulation and distribution / compounding in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 6.1 mg/m³ RCR: 0.196	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.212	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: Low level containment, general ventilation) Derm: Extended TRA workers
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)	Exposure: 16 mg/m³ RCR: 0.515	Exposure: 0.274 mg/kg bw/day RCR: 0.031	RCR: 0.545	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: Low level containment, general ventilation) Derm: Extended TRA

				workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)	Exposure: 18 mg/m³ RCR: 0.579	Exposure: 0.274 mg/kg bw/day RCR: 0.031	RCR: 0.61	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: Low level containment, general ventilation) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	Exposure: 18 mg/m³ RCR: 0.579	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.594	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. RMM: General ventilation) Derm: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.426	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 14 mg/m³ RCR: 0.45	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.451	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 100%. No RMM) Derm: Extended TRA workers

Acute systemic
Not required as no hazard identified

Local effects via inhalation route
Not required as no hazard identified

Local effects via dermal route

A qualitative approach was used to assess the risk of sensitization in accordance with REACH Guidance R.8 (moderate hazard level). The use of gloves and generic organisational measures were proposed as Risk Management Measures to control the risk. Residual exposure was quantitatively estimated and assessed.

Contributing scenario	Acute	Long term	Exposure estimation Method
Formulation and distribution / compounding in closed system, no likelihood of exposure (PROC 1)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)

Formulation and distribution / compounding in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 0.008 mg/cm² RCR: 0.043	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation and distribution / compounding in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation and distribution / compounding in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)	Exposure: 0.08 mg/cm² RCR: 0.431	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use as laboratory reagent (PROC 15)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)

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

Environment

The daily amount per site as mentioned in section 2.1 is the maximum amount (kg/day) that may be safely used, taking into account the default operational conditions as specified in section 2.1 and the release fractions as specified in section 3. This amount is defined as M_{Safe}.

To evaluate the compliance of specific compounding sites, the site-specific substance use rate (M_{Site}) and days emitting ($T_{Emission, Site}$), onsite and offsite emission controls and subsequent total substance emission Reduction Efficiency ($RE_{Total, Site} = 1 - [(1 - RE_{Onsite, Site}) \times (1 - RE_{Offsite, Site})]$), sewage treatment plant effluent flow rate ($G_{Effluent, Site}$) and receiving water dilution factor (q_{Site}) need to be known.

It is simpler and thus may be preferable to some users to compare M_{Site} with M_{Safe}. Adequate control of risk exists if the following conditions are met: [$RE_{Total, Site} \geq RE_{Total, SpERC}$, $G_{Effluent, Site} \geq G_{Effluent, SpERC}$, and $q_{Site} \geq q_{SpERC}$] and $M_{Safe} \geq M_{Site}$.

In case the above comparison does not show safe use, the following scaling possibilities are advised:

- The risk is driven by soil. As a default it is assumed that STP sludge is applied on agricultural soil.

However this may not always be the case. If the STP sludge is not applied to soil, the RCR for agricultural soil will decrease significantly and therefore the amount that may be used will increase.

- When STP sludge is not applied to soil, the risk will be driven by surface water and sediment. The RCR for these protection targets is lower and therefore the volume can be increased with a factor of approximately 1.7 assuming all other conditions stay equal. If the volume is then not yet high enough, scaling based on municipal STP discharge rate and receiving river flow rate is advised.
- As mentioned in section 3, degradation in the STP has been calculated according to first-order kinetics in the model EUSES. This implies that the concentration in the effluent is proportional to the concentration in the influent and so the predicted concentration in effluent depends on the use volume. An alternative approach is to use Monod kinetics in EUSES. This can be applied for readily biodegradable substances in case: a) the release to the WWTP/STP is more or less continuous so the specific bacteria responsible for biodegradation will be able to maintain themselves in the system and b) the total COD load remains within the specifications of the WWTP/STP. When this approach is applied, the substance concentration in the STP effluent is independent of the concentration in the influent and therefore the use volume, and will remain below 50 µg/l. This implies that under these circumstances M_{safe} is theoretically unlimited.

Human health

A DU works within the boundaries of this ES if he fulfills the conditions of use set in section 2. Table 4.1 provides an overview of the assumed effectiveness for the different RMM. The DU can use this effectiveness estimation in order to assess if any deviating RMM will also provide safe use. This is done by multiplying the relevant RCR with the effectiveness of the RMM implemented at the workplace and dividing it by the effectiveness of the RMM listed in section 2. If the shift duration is greater than 8 hours per day, the long term systemic DNELs have to be adapted with the using the following equation, derived from the Brief and Scala model: DNEL Reduction Factor = (8 x hours worked in shift) x ((24 – hours worked in shift) / 16). This equation can not 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 with the adapted DNEL. If the RCR is smaller than 0.725 (1 - 0.275 or 1 - (Sum of all man through environment and generic consumer exposure), the downstreamuser works within the boundaries set by the ES.

Table 4.1 Effectiveness of risk management measures (RMM).

Risk management measure	Assumed effectiveness[2]		Source of effectiveness
	Inhalatory	Dermal	
High level containment - Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).	99.9%	99.9%	Advanced REACH tool (www.advancedreachtool.com).
Medium level containment - Undertake operation under enclosed conditions.	99%	33%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Low level containment - Put lids on containers immediately after use.	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Working outdoor / natural ventilation	30%	-	Advanced REACH tool (www.advancedreachtool.com)
General ventilation (mechanical)	50%	-	Advanced REACH tool (www.advancedreachtool.com).
Local exhaust ventilation, fixed capturing hood	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Local exhaust ventilation, other system	50%	17%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Laminar flow booth	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Respirator (Wear a full face respirator conforming to EN140 with Type A / P2 filter or better. APF >20))	95%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Respirator (Wear a respirator (half face mask) conforming to EN140 with Type A filter / P2 filter or better. APF >10)	90%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Reduction of duration of exposure			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 60 and <= 240 minutes per shift	40%	40%	
> 15 and <= 60 minutes per shift	80%	80%	

[2] All effectiveness's listed are only valid if the RMM is properly designed, installed (if applicable), used and maintained.

<= 15 minutes per shift	90%	80%	
Concentration of substance in mixture			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 5% and <= 25%	40%	75%	
> 1% and <= 5%	80%	95%	
<= 1%	90%	99%	

3. ES 3: Formulation (SU 3); Formulation

1. Title of Exposure scenario	
Environment: * Formulation AISE 1, 5 and 7 - Formulation of Detergents/Maintenance Products: Granular Detergent - Regular (large scale), Granular Detergent -Compact (small scale), Low Viscosity Liquids (large scale) * Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (medium scale), Low Viscosity Liquids (medium scale), High Viscosity Liquids (large scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (large scale), body care soap (medium and large scale) * Formulation AISE 3, 9 and 11 and COLIPA 2 and 16 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (small scale), Low Viscosity Liquids (small scale), High Viscosity Liquids (medium scale); Formulation Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (medium scale), body care soap (small scale) * Formulation AISE 12 and COLIPA 3 - Formulation of Detergents/Maintenance Products: High Viscosity Liquids (small scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (small scale) * Formulation COLIPA 6 and 8 - Formulation of Cosmetics: Medium Viscosity Body Care Products (medium scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (large scale) * Formulation AISE 4 - Formulation of Detergents/Maintenance Products: Granular Detergent - Compact (large scale) * Formulation AISE 6 - Formulation of Detergents/Maintenance Products: Granular Detergent - Compact (small scale) * Formulation COLIPA 4, 7 and 9 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (medium scale), Medium Viscosity Body Care Products (small scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (medium scale) * Formulation COLIPA 5 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (small scale) * Formulation COLIPA 10 - Formulation of Cosmetics: Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (small scale) * CEPE 7 - Formulation of Powder Coatings and Inks - Solids * CEPE 8, 9 - Formulation of Liquid Coatings and Inks - Large Scale and Small Scale * ESVOC 4 - Formulation of solvents and solvent based products * FEICA 2,3 - Formulation of Solvent Borne adhesives - Volatiles (Large Scale and Small Scale) * EFCC2 - Formulation of Construction Chemicals - Use of Volatile substances (additives)	ERC 2
Worker	
Formulation in closed process, no likelihood of exposure - liquid	PROC 1
Formulation in closed process, no likelihood of exposure - solid	PROC 1
Formulation in closed, continuous process with occasional controlled exposure - liquid	PROC 2
Formulation in closed, continuous process with occasional controlled exposure - solid	PROC 2
Formulation in closed batch process (synthesis or formulation) - liquid	PROC 3
Formulation in closed batch process (synthesis or formulation) - solid	PROC 3
Formulation in batch and other process (synthesis) where opportunity for exposure arises - liquid	PROC 4
Formulation in batch and other process (synthesis) where opportunity for exposure arises - solid	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid	PROC 5
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid	PROC 5
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-	PROC 8a

dedicated facilities - liquid	
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid	PROC 8b
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid	PROC 9
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid	PROC 9
Roller application or brushing - liquid	PROC 10
Treatment of articles by dipping and pouring - liquid	PROC 13
Formulation of preparations or articles by tabletting, compression, extrusion, pelletisation - solid	PROC 14
Use as laboratory reagent - liquid	PROC 15
Use as laboratory reagent - solid	PROC 15

2. Conditions of use affecting exposure

2.1 Control of environmental exposure:
Formulation AISE 1, 5 and 7 - Formulation of Detergents/Maintenance Products: Granular Detergent – Regular (large scale), Granular Detergent -Compact (small scale), Low Viscosity Liquids (large scale)

Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (medium scale), Low Viscosity Liquids (medium scale), High Viscosity Liquids (large scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (large scale), body care soap (medium and large scale)

Formulation AISE 3, 9 and 11 and COLIPA 2 and 16 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (small scale), Low Viscosity Liquids (small scale), High Viscosity Liquids (medium scale); Formulation Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (medium scale), body care soap (small scale)

Formulation AISE 12 and COLIPA 3 - Formulation of Detergents/Maintenance Products: High Viscosity Liquids (small scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (small scale)

Formulation COLIPA 6 and 8 - Formulation of Cosmetics: Medium Viscosity Body Care Products (medium scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (large scale)

Formulation AISE 4 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (large scale)

Formulation AISE 6 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (small scale)

Formulation COLIPA 4, 7 and 9 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (medium scale), Medium Viscosity Body Care Products (small scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (medium scale)

Formulation COLIPA 5 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (small scale)

Formulation COLIPA 10 - Formulation of Cosmetics: Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (small scale)

CEPE 7 - Formulation of Powder Coatings and Inks – Solids

CEPE 8, 9 - Formulation of Liquid Coatings and Inks - Large Scale and Small Scale ESVOC 4 - Formulation of solvents and solvent based products FEICA 2,3 - Formulation of Solvent Borne adhesives - Volatiles (Large Scale and Small Scale) EFCC2 - Formulation of Construction Chemicals - Use of Volatile substances (additives)
2.1.1 Control of environmental exposure: Formulation AISE 1, 5 and 7 - Formulation of Detergents/Maintenance Products: Granular Detergent – Regular (large scale), Granular Detergent -Compact (small scale), Low Viscosity Liquids (large scale) **(ERC 2)**
Amounts used
Daily amount per site <= 0.1 tonnes/day Annual amount per site <= 1 tonnes/year
Frequency and duration of use
Emission days / year = not specified
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.2 Control of environmental exposure: Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (medium scale), Low Viscosity Liquids (medium scale), High Viscosity Liquids (large scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (large scale), body care soap (medium and large scale) **(ERC 2)**
Amounts used
Daily amount per site <= 1.264 tonnes/day Annual amount per site <= 278.1 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.3 Control of environmental exposure: Formulation AISE 3, 9 and 11 and COLIPA 2 and 16 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (small scale), Low Viscosity Liquids (small scale), High Viscosity Liquids (medium scale); Formulation Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam

bath) (medium scale), body care soap (small scale) **(ERC 2)**
Amounts used
Daily amount per site <= 0.632 tonnes/day Annual amount per site <= 139 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.4 Control of environmental exposure: Formulation AISE 12 and COLIPA 3 - Formulation of Detergents/Maintenance Products: High Viscosity Liquids (small scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (small scale) **(ERC 2)**
Amounts used
Daily amount per site <= 0.316 tonnes/day Annual amount per site <= 69.52 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.5 Control of environmental exposure: Formulation COLIPA 6 and 8 - Formulation of Cosmetics: Medium Viscosity Body Care Products (medium scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (large scale) **(ERC 2)**
Amounts used
Daily amount per site <= 0.126 tonnes/day Annual amount per site <= 27.8 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.6 Control of environmental exposure:
Formulation AISE 4 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (large scale) **(ERC 2)**

Amounts used

Daily amount per site <= 126.4 tonnes/day

Annual amount per site <= 2.781E4 tonnes/year

Frequency and duration of use

Emission days / year = 220 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.7 Control of environmental exposure:
Formulation AISE 6 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (small scale) **(ERC 2)**

Amounts used

Daily amount per site <= 6.32 tonnes/day

Annual amount per site <= 1.39E3 tonnes/year

Frequency and duration of use

Emission days / year = 220 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.8 Control of environmental exposure:
Formulation COLIPA 4, 7 and 9 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (medium scale), Medium Viscosity Body Care Products (small scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (medium scale) **(ERC 2)**

Amounts used
Daily amount per site <= 0.063 tonnes/day Annual amount per site <= 13.9 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.9 Control of environmental exposure: Formulation COLIPA 5 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (small scale) **(ERC 2)**
Amounts used
Daily amount per site <= 0.042 tonnes/day Annual amount per site <= 9.27 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.10 Control of environmental exposure: Formulation COLIPA 10 - Formulation of Cosmetics: Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (small scale) **(ERC 2)**
Amounts used
Daily amount per site <= 0.032 tonnes/day Annual amount per site <= 0.695 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.11 Control of environmental exposure:
CEPE 7 - Formulation of Powder Coatings and Inks – Solids **(ERC 2)**

Amounts used

Daily amount per site <= 0.253 tonnes/day

Annual amount per site <= 56.93 tonnes/year

Frequency and duration of use

Emission days / year = 225 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.12 Control of environmental exposure:
CEPE 8, 9 - Formulation of Liquid Coatings and Inks - Large Scale and Small Scale **(ERC 2)**

Amounts used

Daily amount per site <= 122.2 tonnes/day

Annual amount per site <= 2.75E4 tonnes/year

Frequency and duration of use

Emission days / year = 225 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.13 Control of environmental exposure:
ESVOC 4 - Formulation of solvents and solvent based products **(ERC 2)**

Amounts used

Daily amount per site <= 6.3 tonnes/day

Annual amount per site <= 1.89E3 tonnes/year

Frequency and duration of use

Emission days / year = 300 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.14 Control of environmental exposure:
FEICA 2,3 - Formulation of Solvent Borne adhesives - Volatiles (Large Scale and Small Scale) **(ERC 2)**

Amounts used

Daily amount per site <= 4.55 tonnes/day

Annual amount per site <= 1E3 tonnes/year

Frequency and duration of use

Emission days / year = 220 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.15 Control of environmental exposure:
EFCC2 - Formulation of Construction Chemicals - Use of Volatile substances (additives) **(ERC 2)**

Amounts used

Daily amount per site <= 0.253 tonnes/day

Annual amount per site <= 6.32 tonnes/year

Frequency and duration of use

Emission days / year = 220 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.2 Control of workers exposure for Formulation in closed process, no likelihood of exposure - liquid **(PROC 1)**

Product characteristics
Covers concentrations up to: 50% Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: One hand face only (240 cm2). Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces. * Open surface 1-3 m². Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin.
2.3 Control of workers exposure for Formulation in closed process, no likelihood of exposure - solid **(PROC 1)**
Product characteristics
Covers concentrations up to: 10% Solid, medium dustiness.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Exposed skin surface assumed: One hand face only (240 cm2) *Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation*. *For each use event, covers use amounts up to 100-1000 kg. Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.4 Control of workers exposure for Formulation in closed, continuous process with occasional controlled exposure - liquid **(PROC 2)**

Product characteristics

Covers concentrations up to: 50%

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of liquid products - falling liquids
*Splash loading
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 l/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.5 Control of workers exposure for Formulation in closed, continuous process with occasional controlled exposure - solid **(PROC 2)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2)

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.6 Control of workers exposure for Formulation in closed batch process (synthesis or formulation) - liquid **(PROC 3)**

Product characteristics

Covers concentrations up to: 50%

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Use in closed batch process (synthesis or formulation).
*Undertake operation under enclosed conditions.

Transfer of liquid products - falling liquids.
*Splash loading.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 l/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.7 Control of workers exposure for Formulation in closed batch process (synthesis or formulation) - solid **(PROC 3)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: One hand face only (240 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.
*Undertake operation under enclosed conditions.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 kg/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.8 Control of workers exposure for Formulation in batch and other process (synthesis) where opportunity for exposure arises - liquid **(PROC 4)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
*Open surface 1-3 m².

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.9 Control of workers exposure for Formulation in batch and other process (synthesis) where opportunity for exposure arises - solid **(PROC 4)**

Product characteristics

Covers concentrations up to: 10%.

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 10-100 g/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.10 Control of workers exposure for Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid **(PROC 5)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.11 Control of workers exposure for Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid **(PROC 5)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 10-100 g/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision

controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.12 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid **(PROC 8a)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands (960 cm2).

Transfer of liquid products - falling liquids.
*Submerged loading.
*For each use event, covers use amounts up to 100-1000 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.13 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid **(PROC 8a)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands (960 cm2).

Transfer of solid products - falling powders.
*For each use event, covers use amounts up to 100-1000 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.14 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid **(PROC 8b)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of liquid products - falling liquids.
*Submerged loading.
*For each use event, covers use amounts up to 100-1000 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.15 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid **(PROC 8b)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of solid products - falling powders.
*For each use event, covers use amounts up to 100-1000 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.16 Control of workers exposure for Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid **(PROC 9)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of liquid products - falling liquids.
*Splash loading.
*For each use event, covers use amounts up to 10-100 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.17 Control of workers exposure for Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid **(PROC 9)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of solid products - falling powders.
*For each use event, covers use amounts up to 10-100 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.18 Control of workers exposure for Roller application or brushing - liquid **(PROC 10)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands (960 cm2).

Spreading of liquid products (0.3-1.0 m^2/hour).
*Avoid carrying out operation for more than 4 hours.

Handling of contaminated objects (0.3-1.0 m^2) - *Contamination > 90 % of surface.*
*Avoid carrying out operation for more than 4 hours.

Technical and organisational conditions and measures

General measures applicable to all activities:

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

Use above 5% concentration:
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

2.19 Control of workers exposure for Treatment of articles by dipping and pouring - liquid **(PROC 13)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation).
**Use above 25% concentration*: Open surface 1-3 m^2
*Open surface 0.3-1 m^2
*Avoid carrying out operation for more than 4 hours.

Handling of contaminated objects (0.3-1.0 m^2) - *Contamination > 90 % of surface.*
*Avoid carrying out operation for more than 4 hours.

Technical and organisational conditions and measures

General measures applicable to all activities:

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

Use between 5- 25% concentration:
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Use above 25% concentration:
*Local exhaust ventilation - efficiency of at least [%]: 50.
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

2.20 Control of workers exposure for Formulation of preparations or articles by tabletting, compression,

extrusion, pelletisation - solid **(PROC 14)**
Product characteristics
Covers concentrations up to: 10% Solid, low dustiness.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Exposed skin surface assumed: Two hands face (480 cm2). Tabletting, compression, extrusion or pelletisation. *For each use event, covers use amounts up to 100-1000 kg/minute.
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin.
2.21 Control of workers exposure for Use as laboratory reagent - liquid **(PROC 15)**
Product characteristics
Covers concentrations up to: 50%. Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: One hand face only (240 cm2). Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation). *Open surface < 0.1 m² Transfer of liquid products - falling liquids. *Splash loading. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to 0.1-1 l/minute. *Submerged loading.Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to <0.1 l/minute. Handling that reduces contact between product and adjacent air.
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.22 Control of workers exposure for Use as laboratory reagent - solid **(PROC 15)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: One hand face only (240 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to <10 gram/minute.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to 10-100 gram/minute.
*Carefully handle the substance to minimise releases. Ensure operatives are trained to minimise exposures. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to <10 gram/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

3. Exposure estimation and reference to its source

The environmental exposure estimates were calculated according to EUSES version 2.1.2.
Degradation in the STP was calculated according to first-order kinetics.

Environment
Formulation AISE 1, 5 and 7 - Formulation of Detergents/Maintenance Products: Granular Detergent – Regular (large scale), Granular Detergent -Compact (small scale), Low Viscosity Liquids (large scale).

Release route	Release rate (kg/day)	Release estimation method
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 1, 5 and 7)
Air	2.528	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 1, 5 and 7)

Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 1, 5 and 7)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (medium scale), Low Viscosity Liquids (medium scale), High Viscosity Liquids (large scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (large scale), body care soap (medium and large scale).

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15)
Air	0.253	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Formulation AISE 3, 9 and 11 and COLIPA 2 and 16 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (small scale), Low Viscosity Liquids (small scale), High Viscosity Liquids (medium scale); Formulation Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (medium scale), body care soap (small scale)

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 3, 9 and 11 and COLIPA 2 and 16)

Air	0.126	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 3, 9 and 11 and COLIPA 2 and 16)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 3, 9 and 11 and COLIPA 2 and 16)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Formulation AISE 12 and COLIPA 3 - Formulation of Detergents/Maintenance Products: High Viscosity Liquids (small scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (small scale)

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 12 and COLIPA 3)
Air	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 12 and COLIPA 3)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 12 and COLIPA 3)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Formulation COLIPA 6 and 8 - Formulation of Cosmetics: Medium Viscosity Body Care Products (medium scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (large scale)

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 6 and 8)
Air	0	SPERC (AISE and COLIPA SpERCs for formulation -

		Formulation COLIPA 6 and 8)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 6 and 8)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Formulation AISE 4 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (large scale).

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 4)
Air	25.28	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 4)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 4)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment
Formulation AISE 6 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (small scale)

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 6
Air	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 6
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation AISE 6

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment Formulation COLIPA 4, 7 and 9 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (medium scale), Medium Viscosity Body Care Products (small scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (medium scale)		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 4, 7 and 9)
Air	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 4, 7 and 9)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 4, 7 and 9)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment Formulation COLIPA 5 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (small scale)		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.263	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 5)
Air	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 5)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 5)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**

Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment Formulation COLIPA 10 - Formulation of Cosmetics: Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (small scale)		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 10)
Air	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 10)
Soil	0	SPERC (AISE and COLIPA SpERCs for formulation - Formulation COLIPA 10)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment CEPE 7 - Formulation of Powder Coatings and Inks – Solids		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.265	SPERC (CEPE 7)
Air	0.025	SPERC (CEPE 7)
Soil	0	SPERC (CEPE 7)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.609**
Freshwater (sediment)	0.805 mg/kg dw	**0.619**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.599**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment CEPE 8, 9 - Formulation of Liquid Coatings and Inks - Large Scale and Small Scale

Release route	Release rate (kg/day)	Release estimation method
Water	0	SPERC (CEPE 8, 9)
Air	7.333	SPERC (CEPE 8, 9)
Soil	0	SPERC (CEPE 8, 9)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	RCR
Freshwater (pelagic)	5.96E-4 mg/L	**0.11**
Freshwater (sediment)	0.146 mg/kg dw	**0.112**
Marine water (pelagic)	4.91E-5 mg/L	**0.091**
Marine water (sediment)	0.012 mg/kg dw	**0.092**
Effluent	0 mg/L	**0**
Agricultural soil	1.6E-4 mg/kg dw	**6.13E-4**

Environment ESVOC 4 - Formulation of solvents and solvent based products		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.26	SPERC (ESVOC 4)
Air	63	SPERC (ESVOC 4)
Soil	0	SPERC (ESVOC 4)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	RCR
Freshwater (pelagic)	0.003 mg/L	**0.606**
Freshwater (sediment)	0.802 mg/kg dw	**0.617**
Marine water (pelagic)	3.17E-4 mg/L	**0.587**
Marine water (sediment)	0.078 mg/kg dw	**0.597**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment FEICA 2, 3 - Formulation of Solvent Borne adhesives - Volatiles (Large Scale and Small Scale)		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	0	SPERC (FEICA 2, 3)
Air	227.5	SPERC (FEICA 2, 3)
Soil	0	SPERC (FEICA 2, 3)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	RCR
Freshwater (pelagic)	5.96E-4 mg/L	**0.11**

Freshwater (sediment)	0.146 mg/kg dw	**0.112**
Marine water (pelagic)	4.91E-5 mg/L	**0.091**
Marine water (sediment)	0.012 mg/kg dw	**0.092**
Effluent	0 mg/L	**0**
Agricultural soil	0.004 mg/kg dw	**0.014**

Environment EFCC2 - Formulation of Construction Chemicals - Use of Volatile substances (additives)		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.265	SPERC (EFCC 2)
Air	2.53	SPERC (EFCC 2)
Soil	0	SPERC (EFCC 2)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.609**
Freshwater (sediment)	0.805 mg/kg dw	**0.619**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.599**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Risk characterisation for man via the environment Formulation AISE 1, 5 and 7 - Formulation of Detergents/Maintenance Products: Granular Detergent – Regular (large scale), Granular Detergent -Compact (small scale), Low Viscosity Liquids (large scale)
Inhalation: RCR = 1.162E-4 Oral: RCR = 8.437E-4
Risk characterisation for man via the environment Formulation AISE 2, 8 and 10 and COLIPA 1, 14 and 15 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (medium scale), Low Viscosity Liquids (medium scale), High Viscosity Liquids (large scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (large scale), body care soap (medium and large scale)
Inhalation: RCR = 7.695E-5 Oral: RCR = 8.431E-4
Risk characterisation for man via the environment Formulation AISE 3, 9 and 11 and COLIPA 2 and 16 - Formulation of Detergents/Maintenance Products: Granular Detergent -Regular (small scale), Low Viscosity Liquids (small scale), High Viscosity Liquids (medium scale); Formulation Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (medium scale), body care soap (small scale)
Inhalation: RCR = 7.695E-5 Oral: RCR = 8.431E-4
Risk characterisation for man via the environment Formulation AISE 12 and COLIPA 3 - Formulation of Detergents/Maintenance Products: High Viscosity

Liquids (small scale); Formulation of Cosmetics: low viscosity liquids (Shampoo, hair conditioner, shower gel, foam bath) (small scale)
Inhalation: RCR = 7.695E-5 Oral: RCR = 8.431E-4
Risk characterisation for man via the environment Formulation COLIPA 6 and 8 - Formulation of Cosmetics: Medium Viscosity Body Care Products (medium scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (large scale)
Inhalation: RCR = 7.695E-5 Oral: RCR = 8.431E-4
Risk characterisation for man via the environment Formulation AISE 4 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (large scale)
Inhalation: RCR = 5.738E-4 Oral: RCR = 8.528E-4
Risk characterisation for man via the environment Formulation AISE 6 - Formulation of Detergents/Maintenance Products: Granular Detergent -Compact (small scale)
Inhalation: RCR = 9.076E-5 Oral: RCR = 8.433E-4
Risk characterisation for man via the environment Formulation COLIPA 4, 7 and 9 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (medium scale), Medium Viscosity Body Care Products (small scale), Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (medium scale)
Inhalation: RCR = 7.695E-5 Oral: RCR = 8.431E-4
Risk characterisation for man via the environment Formulation COLIPA 5 - Formulation of Cosmetics: Fine Fragrances - Cleaning with Water (small scale)
Inhalation: RCR = 7.695E-5 Oral: RCR = 8.431E-4
Risk characterisation for man via the environment Formulation COLIPA 10 - Formulation of Cosmetics: Non-liquid Creams (skin care, body care, mascara, solar oil, make-up foundation) (small scale)
Inhalation: RCR = 6.651E-5 Oral: RCR = 4.986E-4
Risk characterisation for man via the environment CEPE 7 - Formulation of Powder Coatings and Inks – Solids
Inhalation: RCR = 7.719E-5 Oral: RCR = 8.515E-4
Risk characterisation for man via the environment CEPE 8, 9 - Formulation of Liquid Coatings and Inks - Large Scale and Small Scale

Inhalation: RCR = 2.161E-4 Oral: RCR = 1.455E-4
Risk characterisation for man via the environment ESVOC 4 - Formulation of solvents and solvent based products
Inhalation: RCR = 0.002 Oral: RCR = 0.001
Risk characterisation for man via the environment FEICA 2, 3 - Formulation of Solvent Borne adhesives - Volatiles (Large Scale and Small Scale)
Inhalation: RCR = 0.005 Oral: RCR = 2.293E-4
Risk characterisation for man via the environment EFCC2 - Formulation of Construction Chemicals - Use of Volatile substances (additives)
Inhalation: RCR = 1.162E-4 Oral: RCR = 8.437E-4

Worker exposure				
Long-term, systemic				
Contributing scenario	**Inhalation**	**Dermal**	**Combined routes**	**Exposure estimation Method**
Formulation in closed process, no likelihood of exposure - liquid (PROC 1)	Exposure: 0.44 mg/m³ RCR: 0.014	Exposure: 0.003 mg/kg bw/day RCR: 3.857E-4	RCR: 0.015	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: High level containment) Derm: Extended TRA workers
Formulation in closed process, no likelihood of exposure - solid (PROC 1)	Exposure: 0.032 mg/m³ RCR: 0.001	Exposure: 6.857E-4 mg/kg bw/day RCR: 7.713E-5	RCR: 0.001	Inhal: External exposure estimation tool (Advanced REACH Tool. Concentration up to 10%. RMM: High level containment) Derm: Extended TRA workers
Formulation in closed, continuous process with occasional controlled exposure - liquid (PROC 2)	Exposure: 0.69 mg/m³ RCR: 0.022	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.024	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: High level containment) Derm: Extended TRA workers

Formulation in closed, continuous process with occasional controlled exposure - solid (PROC 2)	Exposure: 0.036 mg/m³ RCR: 0.001	Exposure: 0.003 mg/kg bw/day RCR: 3.085E-4	RCR: 0.001	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: High level containment) Derm: Extended TRA workers
Formulation in closed batch process (synthesis or formulation) - liquid (PROC 3)	Exposure: 4.3 mg/m³ RCR: 0.138	Exposure: 0.003 mg/kg bw/day RCR: 3.857E-4	RCR: 0.139	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: Medium level containment) Derm: Extended TRA workers
Formulation in closed batch process (synthesis or formulation) - solid (PROC 3)	Exposure: 0.32 mg/m³ RCR: 0.01	Exposure: 6.857E-4 mg/kg bw/day RCR: 7.713E-5	RCR: 0.01	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: Medium level containment) Derm: Extended TRA workers
Formulation in batch and other process (synthesis) where opportunity for exposure arises - liquid (PROC 4)	Exposure: 4.4 mg/m³ RCR: 0.142	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.149	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: Low level containment) Derm: Extended TRA workers
Formulation in batch and other process (synthesis) where opportunity for exposure arises - solid (PROC 4)	Exposure: 3 mg/m³ RCR: 0.096	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.098	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid (PROC 5)	Exposure: 4.4 mg/m³ RCR: 0.142	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.157	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: Low level containment) Derm: Extended TRA workers

Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid (PROC 5)	Exposure: 3 mg/m³ RCR: 0.096	Exposure: 0.027 mg/kg bw/day RCR: 0.003	RCR: 0.1	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: Low level containment) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid (PROC 8a)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.433	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid (PROC 8a)	Exposure: 3.2 mg/m³ RCR: 0.103	Exposure: 0.027 mg/kg bw/day RCR: 0.003	RCR: 0.106	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid (PROC 8b)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.426	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid (PROC 8b)	Exposure: 3.2 mg/m³ RCR: 0.103	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.104	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid (PROC 9)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.426	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including	Exposure: 0.96 mg/m³ RCR: 0.031	Exposure: 0.014 mg/kg bw/day	RCR: 0.032	Inhal: External exposure estimation tool (Advanced REACH Tool. OC:

weighing) - solid (PROC 9)		RCR: 0.002		Concentration up to 10%. No RMM) Derm: Extended TRA workers
Roller application or brushing - liquid (PROC 10)	Exposure: 16 mg/m³ RCR: 0.515	Exposure: 0.137 mg/kg bw/day RCR: 0.031	RCR: 0.546	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: General ventilation) Derm: Extended TRA workers
Roller application or brushing - liquid (PROC 10)	Exposure: 4 mg/m³ RCR: 0.129	Exposure: 0.137 mg/kg bw/day RCR: 0.031	RCR: 0.16	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 5%. No RMM) Derm: Extended TRA workers
Treatment of articles by dipping and pouring - liquid (PROC 13)	Exposure: 12 mg/m³ RCR: 0.386	Exposure: 0.069 mg/kg bw/day RCR: 0.015	RCR: 0.401	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: LEV, general ventilation) Derm: Extended TRA workers
Treatment of articles by dipping and pouring - liquid (PROC 13)	Exposure: 15 mg/m³ RCR: 0.482	Exposure: 0.069 mg/kg bw/day RCR: 0.015	RCR: 0.497	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 25%. RMM: General ventilation) Derm: Extended TRA workers
Treatment of articles by dipping and pouring - liquid (PROC 13)	Exposure: 2.2 mg/m³ RCR: 0.071	Exposure: 0.069 mg/kg bw/day RCR: 0.015	RCR: 0.086	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 5%. No RMM) Derm: Extended TRA workers
Formulation of preparations or articles by tabletting, compression, extrusion, pelletisation - solid (PROC 14)	Exposure: 0.32 mg/m³ RCR: 0.01	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.011	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA

				workers
Use as laboratory reagent - liquid (PROC 15)	Exposure: 4.2 mg/m³ RCR: 0.135	Exposure: 0.003 mg/kg bw/day RCR: 3.857E-4	RCR: 0.135	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Use as laboratory reagent - solid (PROC 15)	Exposure: 0.092 mg/m³ RCR: 0.003	Exposure: 6.857E-4 mg/kg bw/day RCR: 7.713E-5	RCR: 0.003	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers

Acute systemic
Not required as no hazard identified

Local effects via inhalation route
Not required as no hazard identified

Local effects via dermal route

A qualitative approach was used to assess the risk of sensitization in accordance with REACH Guidance R.8 (moderate hazard level). The use of gloves and generic organisational measures were proposed as Risk Management Measures to control the risk. Residual exposure was quantitatively estimated and assessed.

Contributing scenario	Acute	Long term	Exposure estimation Method
Formulation in closed process, no likelihood of exposure - liquid (PROC 1)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation in closed process, no likelihood of exposure - solid (PROC 1)	Exposure: 3.99E-4 mg/cm² RCR: 0.002	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation in closed, continuous process with occasional controlled exposure - liquid (PROC 2)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation in closed, continuous process with occasional controlled exposure - solid (PROC 2)	Exposure: 8.75E-4 mg/cm² RCR: 0.005	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation in closed batch process (synthesis or formulation) - liquid (PROC 3)	Exposure: 0.002 mg/cm²	N/A	Acute: External exposure estimation tool (Quantitative

	RCR: 0.011		assessment of residual exposure)
Formulation in closed batch process (synthesis or formulation) - solid (PROC 3)	Exposure: 3.99E-4 mg/cm² RCR: 0.002	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation in batch and other process (synthesis) where opportunity for exposure arises - liquid (PROC 4)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation in batch and other process (synthesis) where opportunity for exposure arises - solid (PROC 4)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid (PROC 5)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid (PROC 5)	Exposure: 0.008 mg/cm² RCR: 0.043	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid (PROC 8a)	Exposure: 0.01 mg/cm² RCR: 0.054	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid (PROC 8a)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid (PROC 8b)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid (PROC 8b)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid (PROC 9)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative exposure of residual exposure)
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid (PROC 9)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative exposure of residual exposure)

Roller application or brushing - liquid (PROC 10)*	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Treatment of articles by dipping and pouring - liquid (PROC 13)*	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Formulation of preparations or articles by tabletting, compression, extrusion, pelletisation - solid (PROC 14)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use as laboratory reagent - liquid (PROC 15)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use as laboratory reagent - solid (PROC 15)	Exposure: 3.99E-4 mg/cm² RCR: 0.002	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
*Exposure estimation and risk characterisation was based on long term systemic dermal exposure value and therefore this value is identical for all concentrations.			

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

Environment

The daily amount per site as mentioned in section 2.1 is the maximum amount (kg/day) that may be safely used, taking into account the default operational conditions as specified in section 2.1 and the release fractions as specified in section 3. This amount is defined as M_{Safe}.

To evaluate the compliance of specific formulation, the site-specific substance use rate (M_{Site}) and days emitting ($T_{Emission, Site}$), onsite and offsite emission controls and subsequent total substance emission Reduction Efficiency ($RE_{Total, Site} = 1 - [(1 - RE_{Onsite, Site}) \times (1 - RE_{Offsite, Site})]$), sewage treatment plant effluent flow rate ($G_{Effluent, Site}$) and receiving water dilution factor (q_{Site}) need to be known.

It is simpler and thus may be preferable to some users to compare M_{Site} with M_{Safe}. Adequate control of risk exists if the following conditions are met: [$RE_{Total, Site} \geq RE_{Total, SpERC}$, $G_{Effluent, Site} \geq G_{Effluent, SpERC}$, and $q_{Site} \geq q_{SpERC}$] and $M_{Safe} \geq M_{Site}$.

In case the above comparison does not show safe use, the following scaling possibilities are advised:

- The risk is driven by soil for nearly all formulation contributing scenarios. As a default it is assumed that STP sludge is applied on agricultural soil. However this may not always be the case. If the STP sludge is not applied to soil, the RCR for agricultural soil will decrease significantly and therefore the amount that may be used will increase.
- When STP sludge is not applied to soil, the risk will be driven by surface water and sediment. The RCR for these protection targets is lower and therefore the volume can be increased with a factor of approximately 1.7 assuming all other conditions stay equal. If the volume is then not yet high enough, scaling based on municipal STP discharge rate and receiving river flow rate is advised.
- As mentioned in section 3, degradation in the STP has been calculated according to first-order kinetics in the model EUSES. This implies that the concentration in the effluent is proportional to the concentration in the influent and so the predicted concentration in effluent depends on the use volume. An alternative approach is to use Monod kinetics in EUSES. This can be applied for readily

biodegradable substances in case: a) the release to the WWTP/STP is more or less continuous so the specific bacteria responsible for biodegradation will be able to maintain themselves in the system and b) the total COD load remains within the specifications of the WWTP/STP. When this approach is applied, the substance concentration in the STP effluent is independent of the concentration in the influent and therefore the use volume, and will remain below 50 µg/l. This implies that under these circumstances M_{safe} is theoretically unlimited.

Human health

A DU works within the boundaries of this ES if he fulfills the conditions of use set in section 2. Table 4.1 provides an overview of the assumed effectiveness for the different RMM. The DU can use this effectiveness estimation in order to assess if any deviating RMM will also provide safe use. This is done by multiplying the relevant RCR with the effectiveness of the RMM implemented at the workplace and dividing it by the effectiveness of the RMM listed in section 2. If the shift duration is greater than 8 hours per day, the long term systemic DNELs have to be adapted with the using the following equation, derived from the Brief and Scala model: DNEL Reduction Factor = (8 x hours worked in shift) x ((24 – hours worked in shift) / 16). This equation can not 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 with the adapted DNEL. If the RCR is smaller than 0.725 (1 - 0.275 or 1 - (Sum of all man through environment and generic consumer exposure), the downstreamuser works within the boundaries set by the ES.

Table 4.1 Effectiveness of risk management measures (RMM).

Risk management measure	Assumed effectiveness[3]		Source of effectiveness
	Inhalatory	Dermal	
High level containment - Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).	99.9%	99.9%	Advanced REACH tool (www.advancedreachtool.com).
Medium level containment - Undertake operation under enclosed conditions.	99%	33%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Low level containment - Put lids on containers immediately after use.	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Working outdoor / natural ventilation	30%	-	Advanced REACH tool (www.advancedreachtool.com)
General ventilation (mechanical)	50%	-	Advanced REACH tool (www.advancedreachtool.com).
Local exhaust ventilation, fixed capturing hood	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Local exhaust ventilation, other system	50%	17%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Laminar flow booth	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Respirator (Wear a full face respirator conforming to EN140 with Type A / P2 filter or better. APF >20))	95%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Respirator (Wear a respirator (half face mask) conforming to EN140 with Type A filter / P2 filter or better. APF >10)	90%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Reduction of duration of exposure			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 60 and <= 240 minutes per shift	40%	40%	
> 15 and <= 60 minutes per shift	80%	80%	
<= 15 minutes per shift	90%	80%	
Concentration of substance in mixture			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 5% and <= 25%	40%	75%	
> 1% and <= 5%	80%	95%	
<= 1%	90%	99%	

[3] All effectiveness's listed are only valid if the RMM is properly designed, installed (if applicable), used and maintained.

4. ES 4: Industrial end-use (SU 3); Industrial use

1. Title of Exposure scenario	
Environment: * Industrial use of fragranced products * CEPE 15, 16a - Other spray coating - Volatiles / Abatement including indoor point sources * CEPE 17a - Other spray coating, indoor use - point sources – Solids * ESVOC 11 - Industrial use of solvents in oil field drilling and production operations * ESVOC 13 - Industrial use of formulated lubricants * ESVOC 38 - Use of the substance within laboratory setting, including pilot plants * FEICA 6,7 - Industrial Use of Substances other than Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others * FEICA 8,9 - Industrial Use of Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others adhesives	ERC 4, 5
Worker	
Use in closed process, no likelihood of exposure - liquid	PROC 1
Use in closed process, no likelihood of exposure - solid	PROC 1
Use in closed, continuous process with occasional controlled exposure - liquid	PROC 2
Use in closed, continuous process with occasional controlled exposure - solid	PROC 2
Use in closed batch process - liquid	PROC 3
Use in closed batch process - solid	PROC 3
Use in batch and other process where opportunity for exposure arises - liquid	PROC 4
Use in batch and other process where opportunity for exposure arises - solid	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid	PROC 5
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid	PROC 5
Industrial and non-industrial spraying - liquid	PROC 7 PROC 11
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid	PROC 8b
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid	PROC 9
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid	PROC 9
Roller application or brushing - liquid	PROC 10
Treatment of articles by dipping and pouring - liquid	PROC 13
Production of preparations or articles by tabletting, compression, extrusion, pelletisation - solid	PROC 14
Use as laboratory reagent - liquid	PROC 15
Use as laboratory reagent - solid	PROC 15

Hand-mixing with intimate contact and only PPE available - liquid	PROC 19

2. Conditions of use affecting exposure
Control of environmental exposure for Industrial use of fragranced products is included under Chapter 6.
2.1 Control of environmental exposure: CEPE 15, 16a - Other spray coating - Volatiles / Abatement including indoor point sources CEPE 17a - Other spray coating, indoor use - point sources – Solids ESVOC 11 - Industrial use of solvents in oil field drilling and production operations ESVOC 13 - Industrial use of formulated lubricants ESVOC 38 - Use of the substance within laboratory setting, including pilot plants FEICA 6,7 - Industrial Use of Substances other than Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others FEICA 8,9 - Industrial Use of Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others adhesives
2.1.1 Control of environmental exposure: CEPE 15, 16a - Other spray coating - Volatiles / Abatement including indoor point sources **(ERC 4)**
Amounts used
Daily amount per site <= 0.063 tonnes/day Annual amount per site <= 13.86 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.2 Control of environmental exposure: CEPE 17a - Other spray coating, indoor use - point sources – Solids **(ERC 5)**
Amounts used
Daily amount per site <= 9.1 tonnes/day Annual amount per site <= 2E3 tonnes/year
Frequency and duration of use
Emission days / year = 220 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.3 Control of environmental exposure: ESVOC 11 - Industrial use of solvents in oil field drilling and production operations **(ERC 4)**
Amounts used
Daily amount per site <= 0.018 tonnes/day Annual amount per site <= 0.543 tonnes/year
Frequency and duration of use
Emission days / year = 30 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.4 Control of environmental exposure: ESVOC 13 - Industrial use of formulated lubricants **(ERC 4)**
Amounts used
Daily amount per site <= 42.2 tonnes/day Annual amount per site <= 844 tonnes/year
Frequency and duration of use
Emission days / year = 20 days/year
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.5 Control of environmental exposure: ESVOC 38 - Use of the substance within laboratory setting, including pilot plants **(ERC 4)**
Amounts used
Daily amount per site <= 0.063 tonnes/day Annual amount per site <= 1.264 tonnes/year
Frequency and duration of use

Emission days / year = 20 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.6 Control of environmental exposure: FEICA 6, 7 - Industrial Use of Substances other than Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others **(ERC 5)**

Amounts used

Daily amount per site <= 12.5 tonnes/day

Annual amount per site <= 2.75E3 tonnes/year

Frequency and duration of use

Emission days / year = 220 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.1.7 Control of environmental exposure: FEICA 8, 9 - Industrial Use of Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others adhesives **(ERC 5)**

Amounts used

Daily amount per site <= 1.25 tonnes/day

Annual amount per site <= 275 tonnes/year

Frequency and duration of use

Emission days / year = 220 days/year

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.2 Control of workers exposure for Use in closed process, no likelihood of exposure - liquid **(PROC 1)**
Product characteristics
Covers concentrations up to: 50%. Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are at room temperature. Exposed skin surface assumed: One hand face only (240 cm2). Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces. *Open surface 1-3 m². Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin.
2.3 Control of workers exposure for Use in closed process, no likelihood of exposure - solid **(PROC 1)**
Product characteristics
Covers concentrations up to: 10% Solid, medium dustiness.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Exposed skin surface assumed: One hand face only (240 cm2) *Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.* *For each use event, covers use amounts up to 100-1000 kg. Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.4 Control of workers exposure for Use in closed, continuous process with occasional controlled exposure - liquid **(PROC 2)**

Product characteristics

Covers concentrations up to: 50%

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
*Open surface 1-3 m².

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of liquid products - falling liquids
*Splash loading.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 l/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.5 Control of workers exposure for Use in closed, continuous process with occasional controlled exposure - solid **(PROC 2)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2)

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.6 Control of workers exposure for Use in closed batch process - liquid **(PROC 3)**

Product characteristics

Covers concentrations up to: 50%

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Use in closed batch process (synthesis or formulation).

Transfer of liquid products - falling liquids.
*Splash loading.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 l/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision

controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.7 Control of workers exposure for Use in closed batch process - solid **(PROC 3)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: One hand face only (240 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 0.1-1 kg/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.8 Control of workers exposure for Use in batch and other process where opportunity for exposure arises - liquid **(PROC 4)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
* Open surface 1-3 m².

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.9 Control of workers exposure for Use in batch and other process where opportunity for exposure arises - solid **(PROC 4)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 10-100 g/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.10 Control of workers exposure for Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid **(PROC 5)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with agitated surfaces.
*Open surface 1-3 m².

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.11 Control of workers exposure for Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid **(PROC 5)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to 100-1000 kg.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour.
*For each use event, covers use amounts up to 10-100 g/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Put lids on containers immediately after use.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision

controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.12 Control of workers exposure for Industrial and non-industrial spraying - liquid **(PROC 7 and 11)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands and upper wrists (1500 cm2).

Handling of contaminated objects (0.3-1 m^2) - *Contamination > 90 % of surface.*
*Avoid carrying out operation for more than 4 hours.

Surface spraying with no or low compressed air use.
*Avoid carrying out operation for more than 4 hours.

Industrial:
*Moderate application rate (0.3 - 3 l/minute)
*Ensure that spray direction is only horizontal or downward.

Professional:
*Low application rate (0.03 - 0.3 l/minute)
*Ensure that spray direction is only downward.

For dissolving solids:

Transfer of solid products falling powders.
*Avoid carrying out operation for more than 0.5 hour.

Outdoor use.

Assumes activities are at room temperature.

Professional Use of Façade/surface Cleaning Products.

Covers percentage substance in the product up to 25 %.

Surface spraying with no or low compressed air use.
*Low application rate (0.03 - 0.3 l/minute).
*In any direction (including upwards).
*Stay upwind/keep distance from source.

Covers percentage substance in the product up to 5 %.

Spraying with high compressed air use.
*Moderate application rate (0.3 - 3 l/minute).
*In any direction (including upwards).
*Stay upwind/keep distance from source.

Technical and organisational conditions and measures

General measures applicable to all activities:

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

For industrial use concentration >10%:
Spraying:
* Carry out in a vented booth provided with laminar airflow.
* Use in room with a volume of minimum [m3]: 300 m^3.
* Mechanical ventilation giving at least [ACH]: 1.
Handling:
* Local exhaust ventilation - efficiency of at least [%]: 90%.

For professional use concentration >10%:
**During* spraying: Local exhaust ventilation - efficiency of at least [%]: 50%, or: Wear a half-mask respirator, selected in accordance with EN529 - efficiency of at least [%]: 50%.
**During handling*: Local exhaust ventilation - efficiency of at least [%]: 90%, or: Wear a half-mask respirator, selected in accordance with EN529 - efficiency of at least [%]: 90%.
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

For professional use concentration <10%:
* Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

2.13 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid **(PROC 8a)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands (960 cm2).

Transfer of liquid products - falling liquids.

*Submerged loading.
*For each use event, covers use amounts up to 100-1000 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.14 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid **(PROC 8a)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands (960 cm2).

Transfer of solid products - falling powders.
*For each use event, covers use amounts up to 100-1000 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.15 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid **(PROC 8b)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of liquid products - falling liquids.
*Submerged loading.
*For each use event, covers use amounts up to 100-1000 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.16 Control of workers exposure for Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid **(PROC 8b)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of solid products - falling powders.
*For each use event, covers use amounts up to 100-1000 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.17 Control of workers exposure for Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid **(PROC 9)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of liquid products - falling liquids.
*Splash loading.
*For each use event, covers use amounts up to 10-100 l/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.18 Control of workers exposure for Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid **(PROC 9)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Transfer of solid products - falling powders.
*For each use event, covers use amounts up to 10-100 kg/minute.

Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.19 Control of workers exposure for Roller application or brushing - liquid **(PROC 10)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands (960 cm2).

Spreading of liquid products (0.3-1.0 m^2)
*Avoid carrying out operation for more than 4 hours..

Handling of contaminated objects (0.3-1.0 m^2) - *Contamination > 90 % of surface.*
*Avoid carrying out operation for more than 4 hours.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

Use above 5% concentration:
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

2.20 Control of workers exposure for Treatment of articles by dipping and pouring - liquid (PROC 13) **(PROC 13)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: Two hands face (480 cm2).

Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation).

Use above 25% concentration: Open surface 1-3 m²
*Open surface 0.3-1 m²
*Avoid carrying out operation for more than 4 hours.

Handling of contaminated objects (0.3-1.0 m²) - *Contamination > 90 % of surface.*
*Avoid carrying out operation for more than 4 hours.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

Use between 5- 25% concentration:
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Use above 25% concentration:
*Local exhaust ventilation - efficiency of at least [%]: 50.
*Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

2.21 Control of workers exposure for Production of preparations or articles by tabletting, compression, extrusion, pelletisation - solid **(PROC 14)**

Product characteristics

Covers concentrations up to: 10%

Solid, low dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: Two hands face (480 cm2).

Tabletting, compression, extrusion or pelletisation.
*For each use event, covers use amounts up to 100-1000 kg/minute.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.22 Control of workers exposure for Use as laboratory reagent - liquid **(PROC 15)**

Product characteristics

Covers concentrations up to: 50%.

Liquid.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Assumes activities are at room temperature.

Exposed skin surface assumed: One hand face only (240 cm2).

Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation).
*Open surface < 0.1 m²

Transfer of liquid products - falling liquids.
*Splash loading. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to 0.1-1 l/minute.
*Submerged loading.Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to <0.1 l/minute. Handling that reduces contact between product and adjacent air.

Technical and organisational conditions and measures

Demonstrable and effective housekeeping practices are in place.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use suitable eye protection.

Wear suitable coveralls to prevent exposure to the skin.

2.23 Control of workers exposure for Use as laboratory reagent - solid **(PROC 15)**

Product characteristics

Covers concentrations up to: 10%

Solid, medium dustiness.

Amount used, frequency and duration of use/exposure

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Indoor use.

Exposed skin surface assumed: One hand face only (240 cm2).

Movement and open agitation of powders, granules or pelletised material - handling with high level of agitation.
*For each use event, covers use amounts up to <10 gram/minute.

Transfer of solid products - falling powders.
*Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to 10-100 gram/minute.
*Carefully handle the substance to minimise releases. Ensure operatives are trained to minimise exposures. Avoid carrying out operation for more than 0.5 hour. For each use event, covers use amounts up to <10 gram/minute.

Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin.
2.24 Control of workers exposure for Hand-mixing with intimate contact and only PPE available - liquid **(PROC 19)**
Product characteristics
Covers concentrations up to: 50%. Liquid.
Amount used, frequency and duration of use/exposure
Covers daily exposures up to 8 hours (unless stated differently).
Other operational conditions affecting workers exposure
Indoor use. Assumes activities are above room temperature. Exposed skin surface assumed: Two hands and forearms (1980 cm2). Hand-mixing with intimate contact and only PPE available. **For concentration >10%* and large scale (1-3 m^2): Assumes large workrooms. *Small scale (0.3-1 m^2).
Technical and organisational conditions and measures
Demonstrable and effective housekeeping practices are in place. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. --- *For concentration >10%:* * Local exhaust ventilation - efficiency of at least [%]: 50%. * Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

3. Exposure estimation and reference to its source		
The environmental exposure estimates were calculated according to EUSES version 2.1.2. Degradation in the STP was calculated according to first-order kinetics.		
Environment CEPE 15, 16a - Other spray coating - Volatiles / Abatement including indoor point sources		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.26	SPERC (CEPE 15, 16a)
Air	61.74	SPERC (CEPE 15, 16a)

Soil	0	SPERC (CEPE 15, 16a)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.606**
Freshwater (sediment)	0.802 mg/kg dw	**0.617**
Marine water (pelagic)	3.17E-4 mg/L	**0.587**
Marine water (sediment)	0.078 mg/kg dw	**0.597**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment CEPE 17a - Other spray coating, indoor use - point sources – Solids		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	0	SPERC (CEPE 17a)
Air	200.2	SPERC (CEPE 17a)
Soil	0	SPERC (CEPE 17a)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	5.96E-4 mg/L	**0.11**
Freshwater (sediment)	0.146 mg/kg dw	**0.112**
Marine water (pelagic)	4.91E-5 mg/L	**0.091**
Marine water (sediment)	0.012 mg/kg dw	**0.092**
Effluent	0 mg/L	**0**
Agricultural soil	0.003 mg/kg dw	**0.012**

Environment ESVOC 11 - Industrial use of solvents in oil field drilling and production operations		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.267	Other method
Air	0.5	Other method
Soil	0	Other method

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.62**
Freshwater (sediment)	0.819 mg/kg dw	**0.63**
Marine water (pelagic)	3.23E-4 mg/L	**0.598**
Marine water (sediment)	0.079 mg/kg dw	**0.608**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment

ESVOC 13 - Industrial use of formulated lubricants		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.266	SPERC (ESVOC 13)
Air	63.3	SPERC (ESVOC 13)
Soil	0	SPERC (ESVOC 13)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.609**
Freshwater (sediment)	0.805 mg/kg dw	**0.619**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.599**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment ESVOC 38 - Use of the substance within laboratory setting, including pilot plants		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	1.264	SPERC (ESVOC 38)
Air	1.58	SPERC (ESVOC 38)
Soil	0	SPERC (ESVOC 38)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.607**
Freshwater (sediment)	0.804 mg/kg dw	**0.618**
Marine water (pelagic)	3.18E-4 mg/L	**0.589**
Marine water (sediment)	0.078 mg/kg dw	**0.598**
Effluent	0.027 mg/L	**0.013**
Agricultural soil	0.261 mg/kg dw	**1**

Environment FEICA 6,7 - Industrial Use of Substances other than Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	0	SPERC (FEICA 6, 7)
Air	212.5	SPERC (FEICA 6, 7)
Soil	0	SPERC (FEICA 6, 7)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	5.96E-4 mg/L	**0.11**
Freshwater (sediment)	0.146 mg/kg dw	**0.112**
Marine water (pelagic)	4.91E-5 mg/L	**0.091**
Marine water (sediment)	0.012 mg/kg dw	**0.092**
Effluent	0 mg/L	**0**
Agricultural soil	0.003 mg/kg dw	**0.013**

Environment
FEICA 8, 9 - Industrial Use of Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others adhesives

Release route	**Release rate (kg/day)**	**Release estimation method**
Water	0	SPERC (FEICA 8, 9)
Air	250	SPERC (FEICA 8, 9)
Soil	0	SPERC (FEICA 8, 9)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	5.96E-4 mg/L	**0.11**
Freshwater (sediment)	0.146 mg/kg dw	**0.112**
Marine water (pelagic)	4.91E-5 mg/L	**0.091**
Marine water (sediment)	0.012 mg/kg dw	**0.092**
Effluent	0 mg/L	**0**
Agricultural soil	0.004 mg/kg dw	**0.015**

Risk characterisation for man via the environment
CEPE 15, 16a - Other spray coating - Volatiles / Abatement including indoor point sources

Inhalation: RCR = 0.001

Oral: RCR = 8.639E-4

Risk characterisation for man via the environment
CEPE 17a - Other spray coating, indoor use - point sources – Solids

Inhalation: RCR = 0.004

Oral: RCR = 2.19E-4

Risk characterisation for man via the environment
ESVOC 11 - Industrial use of solvents in oil field drilling and production operations

Inhalation: RCR = 6.723E-5

Oral: RCR = 5.278E-4

Risk characterisation for man via the environment
ESVOC 13 - Industrial use of formulated lubricants

Inhalation: RCR = 1.813E-4 Oral: RCR = 4.989E-4
Risk characterisation for man via the environment ESVOC 38 - Use of the substance within laboratory setting, including pilot plants
Inhalation: RCR = 6.819E-5 Oral: RCR = 4.95E-4
Risk characterisation for man via the environment FEICA 6,7 - Industrial Use of Substances other than Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others
Inhalation: RCR = 0.004 Oral: RCR = 2.236E-4
Risk characterisation for man via the environment FEICA 8,9 - Industrial Use of Solvents in Paper, Board and related Products/ Woodworking and joinery/Footwear and Leather/Textile/Transportation (Automotive/aircraft/rail vehicles)/Industrial Building Construction Adhesives/Others adhesives
Inhalation: RCR = 0.005 Oral: RCR = 2.38E-4

Worker exposure				
Long-term, systemic				
Contributing scenario	**Inhalation**	**Dermal**	**Combined routes**	**Exposure estimation Method**
Use in closed process, no likelihood of exposure - liquid (PROC 1)	Exposure: 0.44 mg/m³ RCR: 0.014	Exposure: 0.003 mg/kg bw/day RCR: 3.857E-4	RCR: 0.015	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: High level containment) Derm: Extended TRA workers
Use in closed process, no likelihood of exposure - solid (PROC 1)	Exposure: 0.032 mg/m³ RCR: 0.001	Exposure: 6.857E-4 mg/kg bw/day RCR: 7.713E-5	RCR: 0.001	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: High level containment) Derm: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure - liquid (PROC 2)	Exposure: 0.69 mg/m³ RCR: 0.022	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.024	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: High level

				containment) Derm: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure - solid (PROC 2)	Exposure: 0.036 mg/m³ RCR: 0.001	Exposure: 0.003 mg/kg bw/day RCR: 3.085E-4	RCR: 0.001	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: High level containment) Derm: Extended TRA workers
Use in closed batch process - liquid (PROC 3)	Exposure: 4.3 mg/m³ RCR: 0.138	Exposure: 0.003 mg/kg bw/day RCR: 3.857E-4	RCR: 0.139	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: Medium level containment) Derm: Extended TRA workers
Use in closed batch process - solid (PROC 3)	Exposure: 0.32 mg/m³ RCR: 0.01	Exposure: 6.857E-4 mg/kg bw/day RCR: 7.713E-5	RCR: 0.01	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: Medium level containment) Derm: Extended TRA workers
Use in batch and other process where opportunity for exposure arises - liquid (PROC 4)	Exposure: 4.4 mg/m³ RCR: 0.142	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.149	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: Low level containment) Derm: Extended TRA workers
Use in batch and other process where opportunity for exposure arises - solid (PROC 4)	Exposure: 3 mg/m³ RCR: 0.096	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.098	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: Low level containment) Derm: Extended TRA workers
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant	Exposure: 4.4 mg/m³ RCR: 0.142	Exposure: 0.137 mg/kg bw/day	RCR: 0.157	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%.

contact) - liquid (PROC 5)		RCR: 0.015		RMM: Low level containment) Derm: Extended TRA workers
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid (PROC 5)	Exposure: 3 mg/m³ RCR: 0.096	Exposure: 0.027 mg/kg bw/day RCR: 0.003	RCR: 0.1	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. RMM: Low level containment) Derm: Extended TRA workers
Industrial and non-industrial spraying - liquid (PROC 7 and 11)	Exposure: 1.5 mg/m³ RCR: 0.048	Exposure: 0.214 mg/kg bw/day RCR: 0.024	RCR: 0.072	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 5%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid (PROC 8a)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.137 mg/kg bw/day RCR: 0.015	RCR: 0.433	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid (PROC 8a)	Exposure: 3.2 mg/m³ RCR: 0.103	Exposure: 0.027 mg/kg bw/day RCR: 0.003	RCR: 0.106	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid (PROC 8b)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.426	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid (PROC 8b)	Exposure: 3.2 mg/m³ RCR: 0.103	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.104	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA

				workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid (PROC 9)	Exposure: 13 mg/m³ RCR: 0.418	Exposure: 0.069 mg/kg bw/day RCR: 0.008	RCR: 0.426	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid (PROC 9)	Exposure: 0.96 mg/m³ RCR: 0.031	Exposure: 0.014 mg/kg bw/day RCR: 0.002	RCR: 0.032	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Roller application or brushing - liquid (PROC 10)	Exposure: 16 mg/m³ RCR: 0.515	Exposure: 0.137 mg/kg bw/day RCR: 0.031	RCR: 0.546	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 5%. No RMM) Derm: Extended TRA workers
Roller application or brushing - liquid (PROC 10)	Exposure: 4 mg/m³ RCR: 0.129	Exposure: 0.137 mg/kg bw/day RCR: 0.031	RCR: 0.16	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 5%. No RMM) Derm: Extended TRA workers
Treatment of articles by dipping and pouring - liquid (PROC 13)	Exposure: 12 mg/m³ RCR: 0.386	Exposure: 0.069 mg/kg bw/day RCR: 0.015	RCR: 0.401	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. RMM: LEV, general ventilation) Derm: Extended TRA workers
Treatment of articles by dipping and pouring - liquid (PROC 13)	Exposure: 15 mg/m³ RCR: 0.482	Exposure: 0.069 mg/kg bw/day RCR: 0.015	RCR: 0.497	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 25%. RMM: General ventilation) Derm: Extended TRA workers
Treatment of articles by dipping and pouring - liquid (PROC 13)	Exposure: 2.2 mg/m³	Exposure: 0.069 mg/kg	RCR: 0.086	Inhal: External exposure estimation tool (Advanced

	RCR: 0.071	bw/day RCR: 0.015		REACH Tool. OC: Concentration up to 5%. No RMM) Derm: Extended TRA workers
Production of preparations or articles by tabletting, compression, extrusion, pelletisation - solid (PROC 14)	Exposure: 0.32 mg/m³ RCR: 0.01	Exposure: 0.007 mg/kg bw/day RCR: 7.713E-4	RCR: 0.011	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Use as laboratory reagent - liquid (PROC 15)	Exposure: 4.2 mg/m³ RCR: 0.135	Exposure: 0.003 mg/kg bw/day RCR: 3.857E-4	RCR: 0.135	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 50%. No RMM) Derm: Extended TRA workers
Use as laboratory reagent - solid (PROC 15)	Exposure: 0.092 mg/m³ RCR: 0.003	Exposure: 6.857E-4 mg/kg bw/day RCR: 7.713E-5	RCR: 0.003	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Hand-mixing with intimate contact and only PPE available - liquid (PROC 19)	Exposure: 14 mg/m³ RCR: 0.45	Exposure: 1.414 mg/kg bw/day RCR: 0.159	RCR: 0.609	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Hand-mixing with intimate contact and only PPE available - liquid (PROC 19)	Exposure: 9.1 mg/m³ RCR: 0.293	Exposure: 1.414 mg/kg bw/day RCR: 0.159	RCR: 0.452	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA workers
Hand-mixing with intimate contact and only PPE available - liquid (PROC 19)	Exposure: 3.6 mg/m³ RCR: 0.116	Exposure: 1.414 mg/kg bw/day RCR: 0.159	RCR: 0.275	Inhal: External exposure estimation tool (Advanced REACH Tool. OC: Concentration up to 10%. No RMM) Derm: Extended TRA

				workers

Acute systemic
Not required as no hazard identified

Local effects via inhalation route
Not required as no hazard identified

Local effects via dermal route

A qualitative approach was used to assess the risk of sensitization in accordance with REACH Guidance R.8 (moderate hazard level). The use of gloves and generic organisational measures were proposed as Risk Management Measures to control the risk. Residual exposure was quantitatively estimated and assessed.

Contributing scenario	Acute	Long term	Exposure estimation Method
Use in closed process, no likelihood of exposure - liquid (PROC 1)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in closed process, no likelihood of exposure - solid (PROC 1)	Exposure: 1.99E-4 mg/cm² RCR: 0.001	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in closed, continuous process with occasional controlled exposure - liquid (PROC 2)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in closed, continuous process with occasional controlled exposure - solid (PROC 2)	Exposure: 8.75E-4 mg/cm² RCR: 0.005	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in closed batch process - liquid (PROC 3)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in closed batch process - solid (PROC 3)	Exposure: 3.99E-4 mg/cm² RCR: 0.002	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in batch and other process where opportunity for exposure arises - liquid (PROC 4)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use in batch and other process where opportunity for exposure arises - solid (PROC 4)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)

Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - liquid (PROC 5)	Exposure: 0.04 mg/cm² RCR: 0.215	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - solid (PROC 5)	Exposure: 0.008 mg/cm² RCR: 0.043	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Industrial and non-industrial spraying - liquid (PROC 7 and 11)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - liquid (PROC 8a)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - solid (PROC 8a)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - liquid (PROC 8b)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - solid (PROC 8b)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - liquid (PROC 9)	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - solid (PROC 9)	Exposure: 0.004 mg/cm² RCR: 0.022	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Roller application or brushing - liquid (PROC 10)*	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Treatment of articles by dipping and pouring - liquid (PROC 13)*	Exposure: 0.02 mg/cm² RCR: 0.108	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Production of preparations or articles by tabletting, compression, extrusion,	Exposure: 0.002 mg/cm²	N/A	Acute: External exposure estimation tool (Quantitative

pelletisation - solid (PROC 14)	RCR: 0.011		assessment of residual exposure)
Use as laboratory reagent - liquid (PROC 15)	Exposure: 0.002 mg/cm² RCR: 0.011	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Use as laboratory reagent - solid (PROC 15)	Exposure: 3.99E-4 mg/cm² RCR: 0.002	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
Hand-mixing with intimate contact and only PPE available - liquid (PROC 19)*	Exposure: 0.05 mg/cm² RCR: 0.269	N/A	Acute: External exposure estimation tool (Quantitative assessment of residual exposure)
*Exposure estimation and risk characterisation was based on long term systemic dermal exposure value and therefore this value is identical for all estimated concentrations/scenarios.			

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

Environment

The daily amount per site as mentioned in section 2.1 is the maximum amount (kg/day) that may be safely used, taking into account the default operational conditions as specified in section 2.1 and the release fractions as specified in section 3. This amount is defined as M_{Safe}.

To evaluate the compliance of specific formulation, the site-specific substance use rate (M_{Site}) and days emitting ($T_{Emission, Site}$), onsite and offsite emission controls and subsequent total substance emission Reduction Efficiency ($RE_{Total, Site} = 1 - [(1 - RE_{Onsite, Site}) \times (1 - RE_{Offsite, Site})]$), sewage treatment plant effluent flow rate ($G_{Effluent, Site}$) and receiving water dilution factor (q_{Site}) need to be known.

It is simpler and thus may be preferable to some users to compare M_{Site} with M_{Safe}. Adequate control of risk exists if the following conditions are met: [$RE_{Total, Site} \geq RE_{Total, SpERC}$, $G_{Effluent, Site} \geq G_{Effluent, SpERC}$, and $q_{Site} \geq q_{SpERC}$] and $M_{Safe} \geq M_{Site}$.

In case the above comparison does not show safe use, the following scaling possibilities are advised:

- The risk is driven by soil for a number of industrial use contributing scenarios. As a default it is assumed that STP sludge is applied on agricultural soil. However this may not always be the case. If the STP sludge is not applied to soil, the RCR for agricultural soil will decrease significantly and therefore the amount that may be used will increase.
- When STP sludge is not applied to soil, the risk will be driven by surface water and sediment. The RCR for these protection targets is lower and therefore the volume can be increased with a factor of approximately 1.7 assuming all other conditions stay equal. If the volume is then not yet high enough, scaling based on municipal STP discharge rate and receiving river flow rate is advised.
- As mentioned in section 3, degradation in the STP has been calculated according to first-order kinetics in the model EUSES. This implies that the concentration in the effluent is proportional to the concentration in the influent and so the predicted concentration in effluent depends on the use volume. An alternative approach is to use Monod kinetics in EUSES. This can be applied for readily biodegradable substances in case: a) the release to the WWTP/STP is more or less continuous so the specific bacteria responsible for biodegradation will be able to maintain themselves in the system and b) the total COD load remains within the specifications of the WWTP/STP. When this approach is applied, the substance concentration in the STP effluent is independent of the concentration in the influent and therefore the use volume, and will remain below 50 µg/l. This implies that under these circumstances M_{safe} is theoretically unlimited.

Human health

A DU works within the boundaries of this ES if he fulfills the conditions of use set in section 2. Table 4.1 provides an overview of the assumed effectiveness for the different RMM. The DU can use this effectiveness estimation in order to assess if any deviating RMM will also provide safe use. This is done by multiplying the relevant RCR with the effectiveness of the RMM implemented at the workplace and dividing it by the effectiveness of the RMM listed in section 2. If the shift duration is greater than 8 hours per day, the long term systemic DNELs have to be adapted with the using the following equation, derived from the Brief and Scala model: DNEL Reduction Factor = (8 x hours worked in shift) x ((24 – hours worked in shift) / 16). This equation can not 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 with the adapted DNEL. If the RCR is smaller than 0.725 (1 - 0.275 or 1 - (Sum of all man through environment and generic consumer exposure), the downstreamuser works within the boundaries set by the ES.

Table 4.1 Effectiveness of risk management measures (RMM).

Risk management measure	Assumed effectiveness[4]		Source of effectiveness
	Inhalatory	Dermal	
High level containment - Process fully enclosed (air tight) and the integrity of the enclosure is monitored at least once a month (containment is not breached).	99.9%	99.9%	Advanced REACH tool (www.advancedreachtool.com).
Medium level containment - Undertake operation under enclosed conditions.	99%	33%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Low level containment - Put lids on containers immediately after use.	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Working outdoor / natural ventilation	30%	-	Advanced REACH tool (www.advancedreachtool.com)
General ventilation (mechanical)	50%	-	Advanced REACH tool (www.advancedreachtool.com).
Local exhaust ventilation, fixed capturing hood	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Local exhaust ventilation, other system	50%	17%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Laminar flow booth	90%	30%	Advanced REACH tool (www.advancedreachtool.com) for the inhalatory effectiveness, the dermal effectiveness is assumed to be 1/3 of the inhalatory effectiveness.
Respirator (Wear a full face respirator conforming to EN140 with Type A / P2 filter or better. APF >20))	95%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Respirator (Wear a respirator (half face mask) conforming to EN140 with Type A filter / P2 filter or better. APF >10)	90%	Not applicable	Advanced REACH tool (www.advancedreachtool.com).
Reduction of duration of exposure			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 60 and <= 240 minutes per shift	40%	40%	
> 15 and <= 60 minutes per shift	80%	80%	
<= 15 minutes per shift	90%	80%	
Concentration of substance in mixture			ECETOC TRA (http://www.ecetoc.org/tra) for the inhalatory effectiveness, expert judgment for dermal effectiveness.
> 5% and <= 25%	40%	75%	
> 1% and <= 5%	80%	95%	
<= 1%	90%	99%	

[4] All effectiveness's listed are only valid if the RMM is properly designed, installed (if applicable), used and maintained.

5. ES 5: Professional end-use (SU 22); Professional use

1. Title of Exposure scenario
Environment
Environmental assessment see Consumer use.
Worker
Worker assessment see Industrial use.

2. Conditions of use affecting exposure
2.1 Control of environmental exposure
Environmental assessment see Consumer use.
2.2 Control of workers exposure
Worker assessment see Industrial use.

3. Exposure estimation and reference to its source
Environment
Environmental assessment see Consumer use.
Risk characterisation for man via the environment
Man through environment assessment see Consumer use.
Worker exposure
Worker assessment see Industrial use.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
Environment See Consumer use. Human health See Industrial use.

6. ES 6: Consumer end-use (SU 21); Consumer use

1. Title of Exposure scenario	
Environment: * Professional and consumer use of fragrances, cosmetics, detergents/maintenance products and laboratory agents * Professional and consumer use of coatings/inks, lubricants and construction chemicals * Professional and consumer use resulting in and after inclusion into / onto a matrix	ERC 8a, 8c, 8d, 8f, 9a, 9b, 10a, 11a
Consumer	
GES4_C Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products	

2. Conditions of use affecting exposure
2.1 Control of environmental exposure: Professional and consumer use of fragrances, cosmetics, detergents/maintenance products and laboratory agents Professional and consumer use of coatings/inks, lubricants and construction chemicals Professional and consumer use resulting in and after inclusion into / onto a matrix
2.1.1 Control of environmental exposure: Professional and consumer use of fragrances, cosmetics, detergents/maintenance products and laboratory agents
Amounts used
Daily wide dispersive use = 0.001 tonnes/day
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.2 Control of environmental exposure: Professional and consumer use of coatings/inks, lubricants and construction chemicals
Amounts used
Daily wide dispersive use = 0.003 tonnes/day
Other given operational conditions affecting environmental exposure
Receiving river flow rate >= 1.8E4 m3/d
Conditions and measures related to municipal sewage treatment plant
Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%). Municipal STP discharge rate >= 2E3 m3/d STP sludge is applied on agricultural soil
2.1.3 Control of environmental exposure: Professional and consumer use resulting in and after inclusion into

/ onto a matrix

Amounts used

Daily wide dispersive use = 0.003 tonnes/day

Other given operational conditions affecting environmental exposure

Receiving river flow rate >= 1.8E4 m3/d

Conditions and measures related to municipal sewage treatment plant

Wastewater is to be treated by a municipal STP (assumed removal efficiency from water phase 95.74%).

Municipal STP discharge rate >= 2E3 m3/d

STP sludge is applied on agricultural soil

2.2 Control of consumers exposure for GES4_C Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products

3. Exposure estimation and reference to its source

The environmental exposure estimates were calculated according to EUSES version 2.1.2.
Degradation in the STP was calculated according to first-order kinetics.

Environment
Professional and consumer use of fragrances, cosmetics, detergents/maintenance products and laboratory agents

Release route	Release rate (kg/day)	Release estimation method
Water	1	ERC (ERC 8d)
Air	0	ERC (ERC 8d)
Soil	0.2	ERC (ERC 8d)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	0.003 mg/L	**0.504**
Freshwater (sediment)	0.667 mg/kg dw	**0.513**
Marine water (pelagic)	2.62E-4 mg/L	**0.485**
Marine water (sediment)	0.064 mg/kg dw	**0.493**
Effluent	0.021 mg/L	**0.01**
Agricultural soil	0.206 mg/kg dw	**0.789**

Environment
Professional and consumer use of coatings/inks, lubricants and construction chemicals

Release route	Release rate (kg/day)	Release estimation method
Water	0.138	SPERC (Wide dispersive use coatings/inks, lubricants, construction chemicals)
Air	0.003	SPERC (Wide dispersive use coatings/inks, lubricants, construction chemicals)
Soil		SPERC

	0.15	(Wide dispersive use coatings/inks, lubricants, construction chemicals)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	8.88E-4 mg/L	**0.164**
Freshwater (sediment)	0.218 mg/kg dw	**0.168**
Marine water (pelagic)	7.84E-5 mg/L	**0.145**
Marine water (sediment)	0.019 mg/kg dw	**0.148**
Effluent	0.003 mg/L	**0.001**
Agricultural soil	0.028 mg/kg dw	**0.109**

Environment Professional and consumer use resulting in and after inclusion into / onto a matrix		
Release route	**Release rate (kg/day)**	**Release estimation method**
Water	0.088	SPERC (Wide dispersive use inclusion into/onto matrix)
Air	0.003	SPERC (Wide dispersive use inclusion into/onto matrix)
Soil	0	SPERC (Wide dispersive use inclusion into/onto matrix)

Protection target	**Exposure estimate** (based on: EUSES 2.0)	**RCR**
Freshwater (pelagic)	7.83E-4 mg/L	**0.145**
Freshwater (sediment)	0.192 mg/kg dw	**0.148**
Marine water (pelagic)	6.78E-5 mg/L	**0.126**
Marine water (sediment)	0.017 mg/kg dw	**0.128**
Effluent	0.002 mg/L	**8.952E-4**
Agricultural soil	0.018 mg/kg dw	**0.07**

Risk characterisation for man via the environment
Inhalation: RCR = 8.055E-5 Oral: RCR = 8.94E-4
Risk characterisation for man via the environment
Inhalation: RCR = 6.747E-5 Oral: RCR = 2.459E-4
Risk characterisation for man via the environment
Inhalation: RCR = 6.663E-5 Oral: RCR = 2.087E-4

Consumer exposure	
Type of product	**Maximum concentration of Orange oil allowed in consumer products (% w/w)**

Laundry & aerosol cleaning spray	2%
Dishwashing product	5%
Aerosol air fresheners	15%
Biocidal products	6%
Fuels (not as main component)	5%
Paints	6%
Paint removers	50%
Coatings and paints, thinners	10%
Non-metal-surface treatment products	0.5%
Polishes	13%

Long-term, systemic

Contributing scenario	Inhalation	Dermal	Oral	Combined routes	Exposure estimation Method
GES4 C Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products	Exposure: 1.94 mg/m³ RCR: 0.249	Exposure: 0.024 mg/kg bw/day RCR: 0.005	Exposure: 0.02 mg/kg bw/day RCR: 0.005	RCR: 0.259	Values derived from IFRA's final report on "REACH Exposure Scenario's for fragrance substances (03/02/2010, page 19 and 20)".

Risk characterisation for acute systemic

Not required as no hazard identified

Local effects via inhalation route

Not required as no hazard identified

Local effects via dermal route

A qualitative approach was used to assess the risk of sensitization in accordance with REACH Guidance R.8 (moderate hazard level). The maximum final concentration in the product is 1% (IFRA's final report on "REACH Exposure Scenario's for fragrance substances, 03/02/2010) and the product should be labelled according to the Detergents Regulation to inform consumers on the intrinsic properties. Sensitizing substances in detergents exceeding 0.01% by weight must be listed using the INCI nomenclature according to the regulation.

Contributing scenario	Acute	Long term	Exposure estimation Method
GES4_C Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products	Exposure: 9.6E-4 mg/cm² RCR: 0.01	N/A	Acute: IFRA report.

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

Environment
Not applicable for consumer uses.

Human health
Not applicable for consumer uses.