Safety Data Sheet
according to UK REACH Regulations SI 2020/1577

Revision date: 2022-07-11
Supercedes: 2022-05-03

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier:

Product trade name:	Kalama* Hexyl Cinnamic Aldehyde
Company product number:	HCAW
UK REACH registration number:	UK-01-7081054431-5-0003
Substance name:	2-Benzylideneoctanal
Substance identification number:	EC 639-566-4
Other means of identification:	AHCA; HCA, α-n Hexyl Cinnamic Aldehyde; α-Hexylcinnamaldehyde; α-n-Hexyl-β-Phenylacrolein; Octanal, 2-(phenylmethylene)

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

Uses:	Fragrance ingredient. See Annex for covered uses.
Uses advised against:	None identified

1.3. Details of the supplier of the safety data sheet:

Manufacturer/Supplier:	Emerald Kalama Chemical Limited Dans Road Widnes, Cheshire WA8 0RF United Kingdom Telephone: +44 (0) 151 423 8000
For further information about this SDS:	Email: product.compliance@emeraldmaterials.com

1.4. Emergency telephone number:

ChemTel (24 hours): 1-800-255-3924 (USA); +1-813-248-0585 (outside USA).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

Product classification according to GB CLP as amended:

Skin Sensitizer, category 1, H317
Hazardous to the aquatic environment, Acute, category 1, H400
Hazardous to the aquatic environment, Chronic, category 2, H411

See Section 2.2 for full text of H (Hazard) statements.

2.2. Label elements:

Product labeling according to GB CLP as amended:

Hazard pictogram(s):

Signal word:
Warning

Hazard statements:
H317 May cause an allergic skin reaction.
H400 Very toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements:
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P280 Wear protective gloves.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P362+P364 Take off contaminated clothing and wash it before reuse.
P391 Collect spillage.

Supplemental information: No Additional Information

Precautionary statements are listed according to the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Annex III and GB CLP Guidance on Labelling and Packaging. Regulations in individual countries/regions may determine which statements are required on the product label. See product label for specifics.

2.3. Other hazards:

PBT/vPvB criteria: This product does not meet the PBT and vPvB classification criteria.
Other hazards: No Additional Information

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

3.1. Substance:

CAS-No.	Chemical Name	Weight%	Classification	H Statements
000101-86-0	α-Hexylcinnamaldehyde	97-100	Aquatic Acute 1- Aquatic Chronic 2- Skin Sens. 1	H317-400-411
0001948-33-0	tert-Butylhydroquinone	0.1-<0.3	Acute Tox. 4 Dermal- Acute Tox. 4 Oral- Aquatic Acute 1- Aquatic Chronic 1- Eye Irrit. 2- Skin Irrit. 2- Skin Sens. 1	H302-312-315-317-319-400-410

CAS-No.	Chemical Name	Weight%	UK REACH Registration No.	EC/List Number
000101-86-0	α-Hexylcinnamaldehyde	97-100	UK-01-7081054431-5-0003	202-983-3 (639-566-4)
0001948-33-0	tert-Butylhydroquinone	0.1-<0.3	DUIN Submitted	217-752-2

See Section 16 for full text of H (Hazard) statements.

Notes: ALPHA-HEXYLCINNAMALDEHYDE: Alternative CAS# 165184-98-5 (EC 639-566-4).

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits.

SECTION 4: First aid measures

4.1. Description of first aid measures:

General: If irritation or other symptoms occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

Eye contact: Any material that contacts the eye should be washed out immediately with water. Get medical attention if symptoms occur.

Skin contact: Immediately remove contaminated clothing and shoes. Wash the affected area with plenty of soap and water until no evidence of the chemical remains (at least 15-20 minutes). Launder clothing before reuse. If skin irritation occurs: Get medical advice/attention.

Inhalation: If affected, remove to fresh air. Get medical attention if symptoms occur.

Ingestion: Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse out the mouth with water. Get medical attention immediately.

Protection of first aid responders: Wear proper personal protective clothing and equipment.

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

Irritation. Preexisting sensitization, skin and/or respiratory disorders or diseases may be aggravated. See section 11 for additional information.

4.3. Indication of any immediate medical attention and special treatment needed:

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media:

Suitable: Use water spray, ABC dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures.

Unsuitable: Do not use direct water stream. May spread fire.

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Product is not considered a fire hazard, but will burn if ignited. Closed container may rupture (due to build up in pressure) when exposed to extreme heat.

Hazardous combustion products: Irritating or toxic substances may be emitted upon burning, combustion or decomposition. See section 10 (10.6 Hazardous decomposition products) for additional information.

5.3. Advice for firefighters:

Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

See Section 8 for recommendations on the use of personal protective equipment. If spilled in an enclosed area, ventilate. Eliminate ignition sources. Personal Protective Equipment must be worn.

6.2. Environmental precautions:

Do not flush liquid into public sewer, water systems or surface waters.

6.3. Methods and material for containment and cleaning up:

Contain by diking with sand, earth or other non-combustible material. Wear proper personal protective clothing and equipment. Absorb spill with an inert material. Place into labeled, closed container; store in safe location to await disposal. Change contaminated clothing and launder before reuse.

6.4. References to other sections:

See Section 8 for recommendations on the use of personal protection and Section 13 for waste disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling:

As with any chemical product, use good laboratory/workplace procedures. Do not cut, puncture, or weld on or near the container. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid eye and skin contact. Avoid inhalation of aerosol, mist, spray, fume or vapor. Avoid drinking, tasting, swallowing or ingesting this product. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area.

7.2. Conditions for safe storage, including any incompatibilities:

Store cool and dry, under well-ventilated conditions. Keep away from heat, sparks and open flames. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Do not reuse empty container without commercial cleaning or reconditioning. Empty container contains residual product which may exhibit hazards of product. Product can easily oxidize. It is recommended that opened containers be padded with nitrogen. Protect from light.

7.3. Specific end use(s):

Further information concerning special risk management measures: see annex of this safety data sheet (exposure scenarios).

SECTION 8: Exposure controls / personal protection

8.1. Control parameters:

Occupational exposure limits (OEL):

Chemical Name	ACGIH - TWA/Ceiling	ACGIH - STEL
α-Hexylcinnamaldehyde	N/E	N/E
tert-Butylhydroquinone	N/E	N/E

Chemical Name	UK WEL
α-Hexylcinnamaldehyde	N/E
tert-Butylhydroquinone	N/E

N/E=Not established (no exposure limits established for the listed substances for listed country/region/organization).

Derived No Effect Levels (DNELs):

α-Hexylcinnamaldehyde

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	6,28 mg/m3	N/E	N/E	0,078 mg/m3
Workers	Dermal	525 µg/cm2	N/E	525 µg/cm	18,2 mg/kg bw/day
General population	Inhalation	4,71 mg/m3	N/E	N/E	0,019 mg/m3
General population	Dermal	78,7 µg/cm2	N/E	78,7 µg/cm2	9,11 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	0,056 mg/kg bw/day

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Human via the environment	Inhalation	N/E	N/E	N/E	0,019 mg/m3
Human via the environment	Oral	N/E	N/E	N/E	0,056 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

α-Hexylcinnamaldehyde

Compartment	PNEC
Freshwater	0,00126 mg/L
Freshwater sediment	3,2 mg/kg dw
Marine water	0,000126 mg/L
Marine water sediment	0,064 mg/kg dw
Intermittent releases	0,00247 mg/L
Soil	0,398 mg/kg dw
STP	10 mg/L
Oral	6,6 mg/kg food

N/E=Not established; N/A=Not applicable (not required); bw=body weight; dw=dry weight; ww=wet weight.

8.2. Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist and vapor away from workers to prevent routine inhalation. Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the SDS.

Individual protection measures, such as personal protective equipment:

Eye/face protection: Wear eye protection.

Hand protection: Avoid skin contact when mixing or handling the material by wearing impervious and chemical resistant gloves. In case of prolonged immersion or frequently repeated contact, gloves with breakthrough times greater than 480 minutes (protection class 6) are recommended. For brief contact or splash applications, gloves with breakthrough times of 30 minutes or greater are recommended (protection class 2 or greater). The protective gloves to be used must comply with the specifications of the standard EN 374. Suitability and durability of a glove is dependent on usage (e.g. frequency and duration of contact, other chemicals which may be handled, chemical resistance of glove material and dexterity). Always seek advice of the glove supplier as to the most suitable glove material.

Skin and body protection: Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.

Respiratory protection: Wear an approved respirator (e.g., an organic vapor respirator, a full face air purifying respirator for organic vapors, or a self-contained breathing apparatus) whenever exposure to aerosol, mist, spray, fume or vapor exceed the applicable exposure limit(s) of any chemical substance listed in this SDS.

Further information: Eyewash fountains and safety showers are recommended in the work area.

Environmental exposure controls: See Sections 6 and 12.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Appearance:	Liquid. Pale yellow
Odour:	Jasmine
Odour threshold:	Not Available
pH:	Not Available
Melting point/Freezing point:	4 °C (39 °F) (solidification point)
Initial boiling point and boiling range °C:	305-311 °C
Initial boiling point and boiling range °F:	581-591 °F
Flash point:	>100 °C (>212 °F) Tag Closed Cup
Evaporation rate:	< 0.01
Flammability (solid, gas):	Not Applicable (liquid)
Upper/lower flammability or explosive limits:	LFL/LEL: Not Available UFL/UEL: Not Available
Vapour pressure:	<0.02 mm Hg @ 20 °C
Vapour density:	Not Available
Relative density:	0.95-0.96 (25 °C)
Solubility in water:	1.62 mg/L @ 20°C
Partition coefficient (n-octanol/water):	5.3 @ 24°C
Autoignition temperature:	236 °C (456 °F)
Decomposition temperature:	Not Available
Viscosity:	Not Available
Explosive properties:	Not explosive

Oxidising properties:	Not oxidizing
% Volatile By weight:	100%
VOC:	100%

9.2. Other information:

Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

10.1. Reactivity:

None known.

10.2. Chemical stability:

This product is stable.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will not occur.

10.4. Conditions to avoid:

Excessive heat and ignition sources.

10.5. Incompatible materials:

Avoid contact with strong oxidizing agents.

10.6. Hazardous decomposition products:

Carbon dioxide and carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects:

Information on likely routes of exposure:

General: Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure.

Eyes: May cause eye irritation.

Skin: May cause allergic skin reaction. Repeated or prolonged skin contact may cause irritation.

Inhalation: High airborne concentrations of vapors resulting from heating, misting or spraying may cause irritation of the respiratory tract and mucous membranes.

Ingestion: May be harmful if swallowed. Ingestion may cause irritation.

Acute toxicity information: Not classified (based on available data, the classification criteria are not met).

Chemical Name	Inhalation LC50	Species	Oral LD50	Species	Dermal LD50	Species
α-Hexylcinnamaldehyde	>2.12 mg/L (aerosol, measured, 4 hours)	Rat/ adult	3100 mg/kg	Rat/ adult male	>3000 mg/kg	Rabbit/ adult
tert-Butylhydroquinone	N/E	N/E	700-1131 mg/kg	Rat/ adult	>1000 mg/kg	Guinea Pig/ adult

Skin corrosion/irritation: Not classified (based on available data, the classification criteria are not met). ALPHA-HEXYLCINNAMALDEHYDE: Skin irritation, rabbit: score = >2 - <2.3; Moderate irritant.

Chemical Name	Skin irritation	Species
α-Hexylcinnamaldehyde	Mild-moderate irritant	Rabbit/ adult
tert-Butylhydroquinone	Moderate irritant	Guinea pig/ adult

Serious eye damage/irritation: Not classified (based on available data, the classification criteria are not met).

Chemical Name	Eye irritation	Species
α-Hexylcinnamaldehyde	Slight irritant	Rabbit/ adult
tert-Butylhydroquinone	Moderate irritant	Rabbit/ adult

Respiratory or skin sensitization: Skin sensitization - Category 1.

Chemical Name	Skin sensitisation	Species
α-Hexylcinnamaldehyde	Sensitizer	Mouse/Local lymph node assay
tert-Butylhydroquinone	Sensitizer	Guinea pig and Human

Carcinogenicity: Not classified (no relevant information found).

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). ALPHA-HEXYLCINNAMALDEHYDE: Alpha-hexylcinnamaldehyde was not mutagenic in in-vivo and in-vitro studies.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). ALPHA-HEXYLCINNAMALDEHYDE: Reproductive and Developmental toxicity screening test (gavage) found a NOAEL >= 100 mg/kg/day for reproductive and developmental toxicity.

Specific target organ toxicity (STOT) - single exposure: Not classified (no relevant information found).

Specific target organ toxicity (STOT) - repeated exposure: Not classified (based on available data, the classification criteria are not met). ALPHA-HEXYLCINNAMALDEHYDE: Repeated dose study, 14 day oral gavage, rat: NOAEL (no-observed-adverse-effect-level) =150-500 mg/kg bw/day (local effects). Repeated dose study, 90-day dermal, rat: LOAEL (Lowest-observable-adverse-effect-level) 125 mg/kg bw/day (local effects); >125 mg/kg bw/day (systemic effects).

Aspiration hazard: Not classified.

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

ALPHA-HEXYLCINNAMALDEHYDE: This substance showed no toxicity to fish at the solubility limit.

Chemical Name	Species	Acute	Acute	Chronic
α-Hexylcinnamaldehyde	Fish	LC50 1.7 mg/L (96 hours)	N/E	N/E
α-Hexylcinnamaldehyde	Invertebrates	EC50 0.247 mg/L (48 hours)	N/E	EC10 69 µg/L (21 days)
α-Hexylcinnamaldehyde	Algae	EC50 >0.065 mg/L (72 hours) (mean measured test concentration)	N/E	N/E
tert-Butylhydroquinone	Fish	LC50 0.6 mg/L (96 hours) (similar materials)	N/E	N/E
tert-Butylhydroquinone	Invertebrates	EC50 3.2 mg/L (96 hours) (similar materials)	N/E	N/E
tert-Butylhydroquinone	Algae	N/E	N/E	N/E

12.2. Persistence and degradability:

Chemical Name	Biodegradation
α-Hexylcinnamaldehyde	Readily biodegradable (OECD 301F)
tert-Butylhydroquinone	Not readily biodegradable

12.3. Bioaccumulative potential:

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
α-Hexylcinnamaldehyde	N/E	5.3 @ 24°C
tert-Butylhydroquinone	N/E	1.52

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
α-Hexylcinnamaldehyde	15800 (OECD 121)
tert-Butylhydroquinone	N/E

12.5. Results of PBT and vPvB assessment:

This product does not meet the PBT and vPvB classification criteria.

12.6. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

Dispose of unused contents (incineration) in accordance with national and local regulations. Dispose of container in accordance with national and local regulations. Ensure the use of properly authorized waste management companies, where appropriate.

See Section 8 for recommendations on the use of personal protective equipment.

SECTION 14: Transport information

The information below is provided to assist in documentation. It may supplement the information on the package. The package in your possession may carry a different version of the label depending on the date of manufacture. Depending on inner packaging quantities and packaging instructions, it may be subject to specific regulatory exceptions.

14.1. UN number: UN3082

14.2. UN proper shipping name:

Environmentally hazardous substance, liquid, n.o.s. (alpha-Hexylcinnamaldehyde)

14.3. Transport hazard class(es):

U.S. DOT hazard class: N/A
Canada TDG hazard class: 9
Europe ADR/RID hazard class: 9
IMDG Code (ocean) hazard class: 9
ICAO/IATA (air) hazard class: 9

A "N/A" listing for the hazard class indicates the product is not regulated for transport by that regulation.

14.4. Packing group: III

14.5. Environmental hazards:

Marine pollutant: Marine Pollutant (IMDG code 2.9.3).

Hazardous substance (USA): Not Applicable

14.6. Special precautions for user:

Not Applicable

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code:

Not Applicable

Notes: For surface shipments within the United States: Not regulated.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

STATUTORY INSTRUMENTS 2020 No. 1577, The REACH etc. (Amendment etc.) (EU Exit) Regulations 2020 [UK REACH]: Applicable components have been registered, are exempt or otherwise compliant. For UK REACH, CAS# 165184-98-5 (EC 639-566-4). UK REACH is only relevant to substances either manufactured or imported into the UK. Emerald Kalama Chemical has met its obligations under the UK REACH regulation. UK REACH information regarding this product is provided for informational purposes only. Each Legal Entity may have differing UK REACH obligations, depending on their place in the supply chain. Emerald's compliance with UK REACH does not imply automatic coverage for Downstream Users located in the UK. For material manufactured outside of the UK, the importer of record must understand and meet their specific obligations under the regulation.

UK Authorizations and/or restrictions on use: Not Applicable

Other UK information: No Additional Information

Chemical inventories:

Regulation	Status
Australian Inventory of Industrial Chemicals (AIIC):	Y
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	N
China Inventory of Existing Chemical Substances (IECSC):	Y
European EC Inventory (EINECS, ELINCS, NLP):	Y
Japan Existing and New Chemical Substances (ENCS):	N
Japan Industrial Safety and Health Law (ISHL):	Y
Korean Existing and Evaluated Chemical Substances (KECL):	Y
New Zealand Inventory of Chemicals (NZIoC):	Y
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Y
Taiwan Inventory of Existing Chemicals:	Y
U.S. Toxic Substances Control Act (TSCA) (Active):	Y

A "Y" listing indicates all intentionally added components are either listed or are otherwise compliant with the regulation. A "N" listing indicates that for one or more components: 1) there is no listing on the public inventory (or is not on the ACTIVE inventory for U.S. TSCA); 2) no information is available; or 3) the component has not been reviewed. A "Y" for New Zealand may mean that a qualified group standard may exist for the components in this product.

Chemical inventory notes: Japan ENCS: Contains <2% unlisted impurity.

Europe REACH (EC) 1907/2006: Applicable components are registered, exempt or otherwise compliant. For Europe REACH, CAS# 165184-98-5 (EC 639-566-4). EU REACH is only relevant to substances either manufactured or imported into the EU. Emerald Kalama Chemical has met its obligations under the EU REACH regulation. EU REACH information regarding this product is provided for informational purposes only. Each Legal Entity may have differing EU REACH obligations, depending on their place in the supply chain. Emerald's compliance with EU REACH does not imply automatic coverage for Downstream Users located in the EU. For material manufactured outside of the EU, the importer of record must understand and meet their specific obligations under the regulation.

15.2. Chemical safety assessment:

A chemical safety assessment has been carried out for the substance or mixture consistent with the EU REACH regulation.

SECTION 16: Other information

Hazard (H) Statements in the Composition section (Section 3):

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Reason for revision: Changes in Section(s): 8, 9, Annex

Evaulation method For classification Of mixtures: Not Applicable (substance)

Legend:
* : Trademark owned by Emerald Kalama Chemical, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
ATE: Acute toxicity estimate
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)
UK WEL: United Kingdom Workplace Exposure Limits

Users Responsibility/Disclaimer of Liability:
The information set forth herein is based on our current knowledge, and is intended to describe the product solely with respect to health, safety and the environment. As such, it must not be interpreted as a guarantee of any specific property of the product. As a result, the customer shall be solely responsible for deciding whether said information is suitable and beneficial.

Safety Data Sheet Preparer:
Product Compliance Department
Emerald Kalama Chemical, LLC
1499 SE Tech Center Place, Suite 300
Vancouver, WA 98683
United States

Annex

Exposure Scenarios

Substance information:

Name of substance: (E)-2-benzylideneoctanal.
EC# 639-566-4 / CAS# 165184-98-5
UK REACH Registration number: UK-01-7081054431-5-0003
EU REACH Registration number: 01-2119533092-50-0006

List of exposure scenarios:

ES1: Formulation.
ES2: Compounding
ES3: Industrial use of fragranced products
ES4: Professional use of fragranced products
ES5: Consumer use of fragranced products

General remarks:

The first tier environmental exposure assessments have at first instance been performed using EUSES v2.1.2 which is part of Chemical Safety Assessment and Reporting tool version 3.6 (CHESAR v3.6). Higher tier assessments have been performed if safe use was not demonstrated using first tier assessments. In these cases Specific Environmental Release Categories (SpERCs) have been used.

This substance is classified as having the potential to induce and/or elicit skin sensitisation (H317). However, the available data do not provide quantitative dose-response information. In these circumstances, Qualitative Chemical Safety Assessment (CSA) is appropriate when there is no basis for setting a DNEL or DMEL, with the aim of reducing or avoiding contact, through the implementation of risk management measures (RMMs) and operational conditions (OCs) that are proportional to the level of concern for the health hazard posed by the substance. Exposures should be controlled to a level that results in an acceptable level of risk (i.e. implementation of the RMMs will ensure that the likelihood of an exposure occurring is negligible, and therefore the risk is considered to be controlled to a level of no concern).

If the user complies with the following generic statements, risks due to skin sensitisation can be considered to be adequately controlled: Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Where there is the potential for additional and significant aerosol exposure (e.g. associated with PROCs 7, 11, 17 or 18): Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

Exposure scenario (1): Formulation

1. Exposure scenario (1)

Short title of the exposure scenario:
Formulation

List of use descriptors:
Process category (PROC): PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15
Environmental release category (ERC): ERC2

List of names of contributing worker scenarios and corresponding PROCs:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC5 Mixing or blending in batch processes. Covers mixing or blending of solid or liquid materials in the context of manufacturing or formulating sectors, as well as upon end use.
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.
PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:
ERC2 Formulation into mixture.

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf).

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Product characteristics:
Concentration of substance in mixture/article:
- PROC1: <=100%.
- PROC3, PROC5, PROC8b, PROC15: <=25%.
- PROC8a, PROC9: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 0,179 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity:
- PROC8b, PROC9: <=1 hour/day.
- PROC3, PROC5, PROC8a: <=4 hours/day.
- PROC1: <=8 hours/day.
- PROC15: <=15 minutes/day.

Other given operational conditions affecting workers exposure:
Location: Indoor use.
Domain: Industrial use.
Process temperature: <= 40 °C.
Assessment tool used: ECETOC TRA Worker v3 for inhalation and dermal exposure.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC8a, PROC8b: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC1, PROC3, PROC9, PROC15: Good general ventilation (3-5 air changes per hour): 30%.
- PROC5: Enhanced general ventilation (5-10 air changes per hour): 70%.
Local exhaust ventilation:
- PROC1: Not required.
- PROC3, PROC5, PROC8a, PROC9, PROC15: Yes (90% effectiveness).
- PROC8b: Yes (95% effectiveness).
Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection:
- PROC1, PROC9: Not required.
- PROC3, PROC5, PROC8a, PROC8b, PROC15: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%).
Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
Minimisation of manual phases/work tasks.
Minimisation of splashes and spills.
Avoidance of contact with contaminated tools and objects.
Regular cleaning of equipment and work area.
Training staff on good practice.
Management/supervision in place to check that RMMs in place are being used correctly and OCs followed.

2.2 Control of environmental exposure

General:
All risk management measures utilised must also comply with all relevant local regulations.

Product characteristics:
Vapour pressure: 0,068 Pa at 25 °C.

Amounts used:
Maximum daily use at a site: 0,174 tons/day.
Maximum annual use at a site: 43,5 tons/year.
Percentage of tonnage used at regional scale: 10 %.

Frequency and duration of use:
Emission days: <=250 days/year.

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0.025; (final release): 0.025. Local release rate: 4,35 kg/day.
Release fraction to wastewater from process (initial release): 0,00013; (final release): 0,00013. Local release rate: 0,023 kg/day (maximum release factor).
Release fraction to soil from process (final release): 0,0001.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Dry sludge application to agricultural soil: Yes (default).

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,58%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:
External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA Worker v3. Only highest figures are presented here.

Assessment method-Environment: EUSES 2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0,068 mg/m3	0,874	PROC3
Worker, long-term, systemic, Dermal	1,645 mg/kg bw/day	0,09	PROC5, PROC8b
Worker, long-term, systemic, Combined routes	N/A	0,878	PROC3
Worker, short-term, local, Inhalation	1,262 mg/m3	0,201	PROC9
Worker, short-term, local, Dermal	0,24 mg/cm2	0,457	PROC5
Worker, long-term, local, Dermal	0,24 mg/cm2	0,457	PROC5

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,0000936 mg/L	0,074	
Freshwater sediment	0,148 mg/kg dw	0,046	
Marine water	0,00000932 mg/L	0,074	
Marine water sediment	0,015 mg/kg dw	0,231	
Soil	0,039 mg/kg dw	0,981	
STP	0,000838 mg/L	<0,01	
Human via environment, Inhalation	0,00083 mg/m3	0,044	
Human via environment, Oral	0,015 mg/kg bw/day	0,264	
Human via environment, Combined routes	N/A	0,308	

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

Notes: The exposure scenario categories consist of a number of activities. An individual worker may conduct one or several of these activities during one shift and a specific PROC or PROCs have been identified as worst-case activities for combined exposure. If parts of the worker's shift are spent conducting PROCs other than the worst-case PROC activities, the daily exposure of this worker will be lower than estimated for the worst case.

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (2): Compounding

1. Exposure scenario (2)

Short title of the exposure scenario:
Compounding

List of use descriptors:
Process category (PROC): PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15
Environmental release category (ERC): ERC2 (SpERC IFRA 2.1b.v1)

List of names of contributing worker scenarios and corresponding PROCs:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC5 Mixing or blending in batch processes. Covers mixing or blending of solid or liquid materials in the context of manufacturing or formulating sectors, as well as upon end use.
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.
PROC14 Tabletting, compression, extrusion, pelletisation, granulation. This covers processing of mixtures and/or substances into a defined shape for further use.
PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:
ERC2 Formulation into mixture.
SpERC IFRA 2.1(b): Formulation of fragrance compounds at small sites.

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf). For further information on CEFIC (The European Chemical Industry Council) Specific Environmental Release Categories (SpERCs), see http://www.cefic.org/Industry-support/Implementing-reach/Libraries/.

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Product characteristics:
Concentration of substance in mixture/article:
- PROC1, PROC15: <=100%.
- PROC2, PROC3, PROC5, PROC8b: <=25%.
- PROC8a, PROC9, PROC14: <=1%.

Physical form of the used product:
- PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15: Liquid.
- PROC14: Solid (medium dustiness).

Vapour pressure: 0,179 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity:
- PROC2, PROC8b, PROC9, PROC15: <=1 hour/day.
- PROC3, PROC5, PROC8a, PROC14: <=4 hours/day.
- PROC1: <=8 hours/day.

Other given operational conditions affecting workers exposure:
Location: Indoor use.
Domain: Industrial use.
Process temperature: <= 40 °C.
Assessment tool used: ECETOC TRA Worker v3 for inhalation and dermal exposure.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC8a, PROC8b, PROC14: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC1, PROC3, PROC9: Good general ventilation (3-5 air changes per hour): 30%.
- PROC2, PROC5, PROC15: Enhanced general ventilation (5-10 air changes per hour): 70%.

Local exhaust ventilation:
- PROC1: Not required.
- PROC2, PROC3, PROC5, PROC8a, PROC9, PROC14, PROC15: Yes (90% effectiveness).
- PROC8b: Yes (95% effectiveness).

Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection:
- PROC1, PROC2, PROC9: Not required.
- PROC3, PROC5, PROC8a, PROC8b, PROC14, PROC15: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%).

Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
Minimisation of manual phases/work tasks.
Minimisation of splashes and spills.
Avoidance of contact with contaminated tools and objects.

Regular cleaning of equipment and work area.
Training staff on good practice.
Management/supervision in place to check that RMMs in place are being used correctly and OCs followed.

2.2 Control of environmental exposure

General:
All risk management measures utilised must also comply with all relevant local regulations.

Product characteristics:
Vapour pressure: 0,068 Pa at 25 °C.

Amounts used:
Maximum daily use at a site: 0,174 tons/day.
Maximum annual use at a site: 43,5 tons/year.
Percentage of tonnage used at regional scale: 10 %.

Frequency and duration of use:
Emission days: <=250 days/year.

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0.025; (final release): 0.025. Local release rate: 4,35 kg/day (SpERC IFRA 2.1b.v1).
Release fraction to wastewater from process (initial release): 0,00013; (final release): 0,00013. Local release rate: 0,023 kg/day (maximum release factor).
Release fraction to soil from process (final release): 0,00001 (SpERC IFRA 2.1b.v1).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Dry sludge application to agricultural soil: Yes (default).

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,58%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:
External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA Worker v3. Only highest figures are presented here.

Assessment method-Environment: EUSES 2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0,068 mg/m3	0,874	PROC3
Worker, long-term, systemic, Dermal	1,645 mg/kg bw/day	0,09	PROC5, PROC8b
Worker, long-term, systemic, Combined routes	N/A	0,878	PROC3
Worker, short-term, local, Inhalation	1,262 mg/m3	0,201	PROC9
Worker, short-term, local, Dermal	0,24 mg/cm2	0,457	PROC5
Worker, long-term, local, Dermal	0,24 mg/cm2	0,457	PROC5

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,0000936 mg/L	0.074	
Freshwater sediment	0,148 mg/kg dw	0,046	
Marine water	0,00000932 mg/L	0.074	
Marine water sediment	0,015 mg/kg dw	0,231	
Soil	0,039 mg/kg dw	0,981	
STP	0,000838 mg/L	<0,01	
Human via environment, Inhalation	0,00083 mg/m3	0,044	
Human via environment, Oral	0,015 mg/kg bw/day	0,264	
Human via environment, Combined routes	N/A	0,308	

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

Notes: The exposure scenario categories consist of a number of activities. An individual worker may conduct one or several of these activities during one shift and a specific PROC or PROCs have been identified as worst-case activities for combined exposure. If parts of the worker's shift are spent conducting PROCs other than the worst-case PROC activities, the daily exposure of this worker will be lower than estimated for the worst case.

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

Health: Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment: Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (3): Industrial use of fragranced products

1. Exposure scenario (3)

Short title of the exposure scenario:
Industrial use of fragranced products

List of use descriptors:
Process category (PROC): PROC1, PROC2, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13
Environmental release category (ERC): ERC4

List of names of contributing worker scenarios and corresponding PROCs:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC4 Chemical production where opportunity for exposure arises.
PROC7 Industrial spraying. Air dispersive techniques i.e. dispersion into air (= atomization) by e.g. pressurized air, hydraulic pressure or centrifugation, applicable for liquids and powders.
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC10 Roller application or brushing. This includes application of paints, coatings, removers, adhesives or cleaning agents to surfaces with potential exposure arising from splashes.
PROC13 Treatment of articles by dipping and pouring.

Name of contributing environmental scenario and corresponding ERCs:
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article).

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf).

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 0,179 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity:
- PROC7, PROC8a, PROC8b: <=1 hour/day.
- PROC4, PROC10: <=4 hours/day.
- PROC1, PROC2, PROC13: <=8 hours/day.

Other given operational conditions affecting workers exposure:
Location: Indoor use.
Domain: Industrial use.
Process temperature: <= 40 °C.
Assessment tool used: ECETOC TRA Worker v3 for inhalation and dermal exposure.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1, PROC4, PROC8b, PROC10: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC2, PROC7, PROC13: Good general ventilation (3-5 air changes per hour): 30%.
- PROC8a: Enhanced general ventilation (5-10 air changes per hour): 70%.
Local exhaust ventilation:
- PROC1: Not required.
- PROC2, PROC4, PROC8a, PROC10, PROC13: Yes (90% effectiveness).
- PROC7, PROC8b: Yes (95% effectiveness).
Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection:
- PROC1, PROC2, PROC8a, PROC8b: Not required.
- PROC4, PROC7, PROC10, PROC13: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%).
Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
Minimisation of manual phases/work tasks.
Minimisation of splashes and spills.
Avoidance of contact with contaminated tools and objects.
Regular cleaning of equipment and work area.
Training staff on good practice.
Management/supervision in place to check that RMMs in place are being used correctly and OCs followed.

2.2 Control of environmental exposure

General:
All risk management measures utilised must also comply with all relevant local regulations.

Product characteristics:
Vapour pressure: 0,068 Pa at 25 °C.

Amounts used:
Maximum daily use at a site: 0,3 ton/day.
Maximum annual use at a site: 66 tons/year.
Percentage of tonnage used at regional scale: 10 %.

Frequency and duration of use:
Emission days: <=220 days/year.

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0,055; (final release): 0,055. Local release rate: 16,5 kg/day (maximum release factor).
Release fraction to wastewater from process (initial release): 0,00006; (final release): 0,00006. Local release rate: 0,018 kg/day (maximum release factor).
Release fraction to soil from process (final release): 0,05.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Dry sludge application to agricultural soil: Yes (default).

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,58%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:
External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA Worker v3. Only highest figures are presented here.

Assessment method-Environment: EUSES 2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0,063 mg/m3	0,809	PROC2, PROC7, PROC13
Worker, long-term, local, Dermal	0.857 mg/kg bw/day	0,047	PROC7
Worker, long-term, systemic, Combined routes	N/A	0.856	PROC7
Worker, short-term, local, Inhalation	1,262 mg/m3	0,201	PROC7
Worker, short-term, local, Dermal	0,04 mg/cm2	0,076	PROC7, PROC10, PROC13
Worker, long-term, local, Dermal	0,04 mg/cm2	0,076	PROC7, PROC10, PROC13

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,0000769 mg/L	0,061	
Freshwater sediment	0,122 mg/kg dw	0,038	
Marine water	0,00000765 mg/L	0,061	
Marine water sediment	0,012 mg/kg dw	0,189	
Soil	0,035 mg/kg dw	0,889	
STP	0,000667 mg/L	<0,01	
Human via environment, Inhalation	0,00277 mg/m3	0,146	
Human via environment, Oral	0,045 mg/kg bw/day	0,811	
Human via environment, Combined routes	N/A	0,956	

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

Notes: The exposure scenario categories consist of a number of activities. An individual worker may conduct one or several of these activities during one shift and a specific PROC or PROCs have been identified as worst-case activities for combined exposure. If parts of the worker's shift are spent conducting PROCs other than the worst-case PROC activities, the daily exposure of this worker will be lower than estimated for the worst case.

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (4): Professional use of fragranced products

1. Exposure scenario (4)

Short title of the exposure scenario:
Professional use of fragranced products

List of use descriptors:
Product category (PC): PC3, PC28, PC31, PC35, PC36, PC39
Process category (PROC): PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19
Environmental release category (ERC): ERC8a (SpERC AISE 8a.1.a.v2, AISE 8a.1.c.v2)

List of names of contributing worker scenarios and corresponding PROCs:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC4 Chemical production where opportunity for exposure arises.
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC10 Roller application or brushing. This includes application of paints, coatings, removers, adhesives or cleaning agents to surfaces with potential exposure arising from splashes.
PROC11 Non industrial spraying. Air dispersive techniques i.e. dispersion into air (= atomization) by e.g. pressurized air, hydraulic pressure or centrifugation, applicable for liquids and powders.
PROC13 Treatment of articles by dipping and pouring.
PROC19 Manual activities involving hand contact. Addresses tasks, where exposure of hands and forearms can be expected; no dedicated tools or specific exposure controls other than PPE can be put in place.

Name of contributing environmental scenario and corresponding ERCs:
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).
SpERC AISE 8a.1.a.v2: Wide Dispersive Use in 'Down the Drain' cleaning and maintenance products.
SpERC AISE 8a.1.c.v2: Wide Dispersive Use in Aerosol cleaning and maintenance products.

Further explanations:
PC3 Air care products.
PC36 Water softeners.
PC28 Perfumes, fragrances.
PC31 Polishes and wax blends.
PC35 Washing and cleaning products.
PC39 Cosmetics, personal care products.

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf). For further information on CEFIC (The European Chemical Industry Council) Specific Environmental Release Categories (SpERCs), see http://www.cefic.org/Industry-support/Implementing-reach/Libraries/.

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Product characteristics:
Concentration of substance in mixture/article:
- PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19: <=1%.
- PROC1: <=100%.

Physical form of the used product: Liquid.
Vapour pressure: 0,179 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity:
- PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13: <=1 hour/day.
- PROC1, PROC2: <=8 hours/day.
- PROC19: <=15 minutes/day.

Other given operational conditions affecting workers exposure:
Location: Indoor use.
Domain: Professional use.
Process temperature: <= 40 °C.
Assessment tool used:
- PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13, PROC19: ECETOC TRA Worker v3 for inhalation and dermal exposure.
- PROC11: ECETOC TRA Worker v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.

Technical conditions and measures at process level (source) to prevent release:
Activity class - subclass (ART v1.5): PROC11: Spray application of liquids (in a space). Small scale space spraying. Spray direction: Spraying in any direction (including upwards). Process not fully enclosed but demonstrable and effective housekeeping practices in place. Primary controls: hood (80% reduction). Containment: Low level (90%).

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1: Good general ventilation (3-5 air changes per hour): 30%.
- PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13, PROC19: Enhanced general ventilation (5-10 air changes per hour): 70%.
- PROC11: Ventilation rate >=30 air changes per hour (ART 1.5).

Local exhaust ventilation: Not required.

Occupational Health and Safety Management System: Basic.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection:
- PROC1: Not required.
- PROC4, PROC8b, PROC13: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%).
- PROC2, PROC8a, PROC10, PROC11, PROC19: Yes (Respirator with APF of 20) (Effectiveness Inhalation: 95%).
Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
Minimisation of manual phases/work tasks.
Minimisation of splashes and spills.
Avoidance of contact with contaminated tools and objects.
Regular cleaning of equipment and work area.
Training staff on good practice.
Management/supervision in place to check that RMMs in place are being used correctly and OCs followed.

2.2 Control of environmental exposure

General:
All risk management measures utilised must also comply with all relevant local regulations.

Product characteristics:
Vapour pressure: 0,068 Pa at 25 °C.

Amounts used:
Daily wide dispersive use: 0,0000115 tons/day.
Percentage of tonnage used at regional scale: 2 %.

Frequency and duration of use:
Emission days: <=365 days/year.
Dispersive use.

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
Professional use.
Release fraction to air from process:
- ERC8a: (initial release): 0,0; (final release): 0,0 (SpERC AISE 8a.1.a.v2).
- ERC8a: (initial release): 1,0; (final release): 1,0 (SpERC AISE 8a.1.c.v2).
Release fraction to wastewater from process:
- ERC8a: (initial release): 1.0; (final release): 1.0. Local release rate: 0,012 kg/day (SpERC AISE 8a.1.a.v2).
- ERC8a: (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (SpERC AISE 8a.1.c.v2).
Release fraction to soil from process (final release): 0.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Dry sludge application to agricultural soil: Yes (default).

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,58%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:
External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13, PROC19: ECETOC TRA Worker v3 for inhalation and dermal exposure. PROC11: ECETOC TRA Worker v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure. Only highest figures are presented here.

Assessment method-Environment: EUSES 2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0,068 mg/m3	0,867	PROC2, PROC8a, PROC10
Worker, long-term, systemic, Dermal	2,829 mg/kg bw/day	0,155	PROC19
Worker, long-term, systemic, Combined routes	N/A	0,897	PROC10
Worker, short-term, local, Inhalation	5,408 mg/m3	0,861	PROC11
Consumer, short-term, local, Dermal	0,1 mg/cm2	0,19	PROC11, PROC19
Worker, long-term, local, Dermal	0,1 mg/cm2	0,19	PROC11, PROC19

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,0000481 mg/L / 0,00000632 mg/L	0,038 / <0,01	CS1 / CS2
Freshwater sediment	0,076 mg/kg dw / 0,01 mg/kg dw	0,024 / <0,01	CS1 / CS2

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Marine water	0,00000483 mg/L / 0,000000645 mg/L	0,038 / <0,01	CS1 / CS2
Marine water sediment	0,00764 mg/kg dw / 0,00102 mg/kg dw	0,119 / 0,016	CS1 / CS2
Soil	0,019 mg/kg dw / 0,0000831 mg/kg dw	0,48 / <0,01	CS1 / CS2
STP	0,000428 mg/L / 0 mg/L	<0,01 / <0,01	CS1 / CS2
Human via environment, Inhalation	0,00000137 mg/m3 / 0,00000135 mg/m3	<0,01 / <0,01	CS1 / CS2
Human via environment, Oral	0,000957 mg/kg bw/day / 0,00009 mg/kg bw/day	0,017 / <0,01	CS1 / CS2
Human via environment, Combined routes	N/A	0,017 / <0,01	CS1 / CS2

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

Notes: The exposure scenario categories consist of a number of activities. An individual worker may conduct one or several of these activities during one shift and a specific PROC or PROCs have been identified as worst-case activities for combined exposure. If parts of the worker's shift are spent conducting PROCs other than the worst-case PROC activities, the daily exposure of this worker will be lower than estimated for the worst case.

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (5): Consumer use of fragranced products

1. Exposure scenario (5)

Short title of the exposure scenario:
Consumer use of fragranced products

List of use descriptors:
Product category (PC): PC3, PC8, PC28, PC31, PC35, PC36, PC39
Environmental release category (ERC): ERC8a (SpERC AISE 8a.1.a.v2, AISE 8a.1.c.v2)

Name of contributing environmental scenario and corresponding ERCs:
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).
- CS1: SpERC AISE 8a.1.a.v2: Wide Dispersive Use in 'Down the Drain' cleaning and maintenance products.
- CS2: SpERC AISE 8a.1.c.v2: Wide Dispersive Use in Aerosol cleaning and maintenance products.

Further explanations:
PC3 Air care products (CS3-CS5).
- CS3: Air fresheners aerosol - aqueous, concentrated (mini-aerosol, timed release aerosol)(AISE C17).
- CS4: Air fresheners non aerosol - perfume in/on solid substrate.
- CS5: Air fresheners non aerosol - diffusers (heated+electrical).

PC31 Polishes and wax blends (CS6).
- CS6: Furniture floor and leather care (spray, liquid) - spray (furniture, shoes)(AISE C20).

PC35 Washing and cleaning products (CS7-CS16).
- CS7: Laundry regular (liquid)(AISE C1).
- CS8: Fabric conditioners (liquid concentrate)(AISE C3)
- CS9: Laundry additives (liquid bleach)(AISE C4).
- CS10: Hand dishwashing (liquid concentrate)(AISE C5).
- CS11: Machine dishwashing (liquid)(AISE C6).
- CS12: Surface cleaners (liquid)(AISE C7).
- CS13: Surface cleaners (powder)(AISE C7).
- CS14: Laundry aids (ironing aids-spray)(AISE C12).
- CS15: Wipes (bathroom) (AISE C15).
- CS16: Surface cleaners (spray)(AISE C7).

PC8 Biocidal products (CS17-CS18).
- CS17: Insecticides (liquid electric, spray neat).
- CS18: Repellents.

PC28 Perfumes, fragrances (CS19).
PC36 Water softeners (CS20).
PC39 Cosmetics, personal care products (CS21).

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf). For further information on CEFIC (The European Chemical Industry Council) Specific Environmental Release Categories (SpERCs), see http://www.cefic.org/Industry-support/Implementing-reach/Libraries/.

2. Conditions of use affecting exposure

2.1 Control of consumer exposure

General:
CS17-CS21 (PC8, PC28, PC36, PC39): Risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

Product characteristics:
Concentration of substance in mixture/article:
- CS6, CS16: <=0,1%.
- CS3: <=0,25%.
- CS14: <=0,5%.
- CS7, CS9-CS11: <=1%.
- CS8, CS12, CS13, CS15: <=2%.
- CS5: <=10%.
- CS4: <=100%.

Physical form of the used product:
- CS3-CS12, CS14-CS16: Liquid.
- CS13: Solid (powder).

Vapour pressure: 0.068 Pa at 25 °C.
Exposure via inhalation route: CS3-CS6, CS14, CS16: Yes. CS7-CS13, CS15: Not relevant.
Exposure via dermal route: CS3-CS5, CS11: Dermal exposure assumed to be negligible. CS6-CS10, CS12-CS16: Yes.
Oral contact foreseen: CS3-CS9, CS12-CS16: No. CS10, CS11: Yes.
Spray: CS3, CS6, CS14, CS16: Yes. CS4, CS5, CS7-CS13, CS15: No.

Amounts used:
Applied amounts for each use event:
- CS3: <=8.4 g.
- CS4: <=0,00174 g.
- CS5: <=0,00072 g.
- CS6: total mass sprayed per use - <=60000 mg (inhalation); concentration in wash solution - <=1000 mg/cm3 (dermal).
- CS7: concentration in wash solution - <=1000 mg/cm3 (dermal).
- CS8: <=90 g (undiluted product); concentration in wash solution - <=10 mg/m3 (dermal).
- CS9: <=100 g (undiluted product); concentration in wash solution - <=1000 mg/cm3 (dermal).
- CS10, CS11: concentration - <=1 mg/cm3 (dermal).
- CS12: concentration in wash solution - <=22 mg/cm3 (dermal).
- CS13: concentration in wash solution - <=8 mg/cm3 (dermal).
- CS14: <=20 g; total mass sprayed per use - <=20000 mg (inhalation).
- CS15: concentration in wash solution - <=1000 mg/cm3 (dermal).
- CS16: <=30 g; total mass sprayed per use - <=30000 mg (inhalation); concentration in wash solution - <=1000 mg/cm3 (dermal).

Time weight average concentration predicted using the BAMA indoor air single spray model (TWA BAMA):
- CS3: 6,619 mg/m3.
- CS4: 20,795 mg/m3.
- CS5: 0,137 mg/m3.

Frequency and duration of use/exposure:
Duration covers exposure up to:
- CS7-CS9, CS15, CS16: 0,167 hours/event.
- CS3, CS4: 0,25 hours/event.
- CS12, CS13: 0,33 hours/event.
- CS10: 0,75 hours/event.
- CS6, CS14: 1 hour/event.
- CS5: 4 hours/event.

Frequency: covers use frequency: frequent use per year.
- CS6, CS15: up to 0,43 times/day.
- CS14: up to 0,71 times/day.
- CS3-CS5, CS11-CS13, CS16: up to 1 time/day.
- CS9: up to 1,1 times/day.
- CS8: up to 1,4 times/day.
- CS7: up to 2 times/day.
- CS10: up to 3 times/day.

Human factors not influenced by risk management:
Body parts potentially exposed:
- CS6, CS12, CS13, CS15, CS16: Hands.
- CS7-CS9: Whole body.
- CS10: Hands and forearms.

Inhalation factor = 1.
Dermal transfer factor=0,2.
Oral transfer factor = 1.

Other given operational conditions affecting consumers exposure:
Location: Indoor use.
Body weight: 60 kg.
Inhalation exposure model - covers use in room size of:
- CS3, CS4: 2,5 m3.
- CS16: 15 m3.
- CS14: 20 m3.
- CS5, CS6: 58 m3.

Inhalation rate:
- CS3-CS5: 0,54 m3/hour.
- CS6, CS14, CS16: 1,08 m3/hour.

Skin contact area:
- CS6, CS12, CS13, CS15, CS16: up to 857,5 cm2.
- CS10: up to 2082,5 cm2.

- CS8: up to 16398 cm2.
- CS7, CS9: up to 17225 cm2.
Thickness of product layer in contact with skin: CS6-CS10, CS12-CS16: 0,01 cm.
Fraction of product layer in contact with skin: CS6-CS10, CS12-CS16: 1.
Fraction remaining in final liquor before spinning: CS8, CS9: 0,025.
Fraction of liquor remaining in final liquor after final spinning: CS8, CS9: 0,6.
Total fabric weight: CS8, CS9: 3500 g.
Fabric density: CS8, CS9: 10 mg/cm2.
Amount of water left on dishes after rinsing: CS10, CS11: 0,000055 mL/cm2.
Area of dishes in daily contact with food: CS10, CS11: 5400 cm2.

Conditions and measures related to information and behavioral advice to consumers:
Assessment tool used: ECETOC TRA v3.1 (R15) model (consumer module) in which: Fragrance concentration in fragranced end-product from the IFRA guidance (2012) is used at Tier 1.5 level consumer risk assessment.
- CS3-CS5: Tier 2 AISE REACT 1.0 Consumer Tool used for inhalation exposure.
- CS6, CS14, CS16: Tier 2 AISE REACT 1.0 Consumer Tool used for inhalation and dermal exposures.
- CS7-CS9, CS12, CS13, CS15: Tier 2 AISE REACT 1.0 Consumer Tool used for dermal exposure.
- CS10: Tier 2 AISE REACT 1.0 Consumer Tool used for dermal and oral exposures.
- CS11: Tier 2 AISE REACT 1.0 Consumer Tool used for oral exposure.

Conditions and measures related to personal protection and hygiene:
General ventilation: ventilation rate:
- CS3, CS4: 2 air changes/ hour.
- CS5: 0.5 air changes/ hour.

2.2 Control of environmental exposure

General:
All risk management measures utilised must also comply with all relevant local regulations.

Product characteristics:
Vapour pressure: 0,068 Pa at 25 °C.

Amounts used:
Daily wide dispersive use: 0,0000231 tons/day.
Percentage of tonnage used at regional scale: 4 %.

Frequency and duration of use:
Emission days: <=365 days/year.
Dispersive use.

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
Consumer use.
Release fraction to air from process:
- ERC8a: (initial release): 0,0; (final release): 0,0 (CS1).
- ERC8a: (initial release): 1,0; (final release): 1,0 (CS2).
Release fraction to wastewater from process:
- ERC8a: (initial release): 1.0; (final release): 1.0. Local release rate: 0,023 kg/day (CS1).
- ERC8a: (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (CS2).
Release fraction to soil from process (final release): 0.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Dry sludge application to agricultural soil: Yes (default).

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,58%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:
External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA v3.1 (R15) model (consumer module) in which: Fragrance concentration in fragranced end-product from the IFRA guidance (2012) is used at Tier 1.5 level consumer risk assessment. Tier 2 AISE REACT 1.0 Consumer Tool. Only highest figures are presented here.

Assessment method-Environment: EUSES 2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Inhalation	0,013 mg/m3	0,704	CS4
Consumer, long-term, systemic, Dermal	0,572 mg/kg bw/day	0,063	CS15
Consumer, long-term, systemic, Oral	0,0000495 mg/kg bw/day	<0,01	CS10, CS11
Consumer, long-term, systemic, Combined routes	N/A	0,704	CS4

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,0000953 mg/L / 0,0000117 mg/L	0,076 / <0,01	CS1 / CS2
Freshwater sediment	0,151 mg/kg dw / 0,019 mg/kg dw	0,047 / <0,01	CS1 / CS2
Marine water	0,00000949 mg/L / 0,00000113 mg/L	0,075 / <0,01	CS1 / CS2
Marine water sediment	0,015 mg/kg dw / 0,00179 mg/kg dw	0,235 / 0,028	CS1 / CS2
Soil	0,038 mg/kg dw / 0,0000972 mg/kg dw	0,958 / <0,01	CS1 / CS2
STP	0,000856 mg/L / 0 mg/L	<0,01 / <0,01	CS1 / CS2
Human via environment, Inhalation	0,00000162 mg/m3 / 0,00000158 mg/m3	<0,01 / <0,01	CS1 / CS2
Human via environment, Oral	0,00188 mg/kg bw/day / 0,000151 mg/kg bw/day	0,034 / <0,01	CS1 / CS2
Human via environment, Combined routes	N/A	0,034 / <0,01	CS1 / CS2

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.