Emerald Performance Materials®
Kalama Chemical

Safety Data Sheet

according to Regulation (EC) 1907/2006 (REACH)

Revision date: 2018-03-23
Supercedes: 2016-07-06

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

1.1. Product identifier:

Product trade name:	Kalama* Cyprinal
Company product number:	CYPRINAL
REACH registration number:	01-2119538797-21-0000
Substance name:	(2E)-2-Methyl-3-phenylacrylaldehyde
Substance identification number:	EC 701-219-0
Other means of identification:	32143; Cinnamaldehyde, alpha-methyl-; 2-Propenal, 2-methyl-3-phenyl-; alpha-Methylcinnamic aldehyde; α-Methylcinnamaldehyde

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

Uses:	Fragrance ingredient. Intermediate. Industrial applications. Professional applications. Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. 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. FAX: +44 (0) 151 423 8127.
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); 1-300-954-583 (Australia); 000-800-100-4086 (India).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

Product classification according to Regulation (EC) 1272/2008 (CLP) as amended:

Skin Sensitizer, category 1, H317

2.2. Label elements:

Product labeling according to Regulation (EC) 1272/2008 (CLP) as amended:

Hazard pictogram(s):

Signal word:
Warning

Hazard statements:
H317 May cause an allergic skin reaction.

Precautionary statements:
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
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.

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 ECHA 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
0000101-39-3	2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	99-100	Skin Sens. 1	H317

CAS-No.	Chemical Name	Weight%	REACH Registration No.	EC/List Number
0000101-39-3	2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	99-100	01-2119538797-21-0000	701-219-0 (202-938-8)

See Section 16 for full text of H (Hazard) statements (EC 1272/2008).

Notes: 2-METHYL-3-PHENYLACRYLALDEHYDE: Alternative CAS# 15174-47-7 (EC 701-219-0, (2E)-2-Methyl-3-phenylacrylaldehyde).

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: Immediately flush eyes with plenty of clean water for an extended time, not less than fifteen (15) minutes. Flush longer if there is any indication of residual chemical in the eye. Ensure adequate flushing of the eyes by separating the eyelids with fingers and roll eyes in a circular motion. If eye irritation persists: Get medical advice/attention.

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. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a POISON CENTER or doctor/physician if you feel unwell.

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: None known.

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. Combustion hazard: waste soaked with this product may heat to temperatures causing self-ignition if improperly discarded. Many aldehydes readily oxidize exothermically when exposed to air. Any clean up materials, like rags, towels, etc. should be washed with water with mild soap or laundered with mild detergent before proper disposal to avoid the potential temperature rise from oxidation.

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. Combustion hazard: waste soaked with this product may heat to temperatures causing self-ignition if improperly discarded. Immediately after use, rags, steel wool or other waste should be wetted or cleaned with water with mild soap or laundered with mild detergent or placed into a water-filled metal container before proper disposal.

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. 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. Shelf life: 24 months. 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.

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	EU OELV	EU IOELV	ACGIH - TWA/Ceiling	ACGIH - STEL
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	N/E	N/E	N/E	N/E

Chemical Name	UK WEL	Ireland OEL
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	N/E	N/E

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

Derived No Effect Levels (DNELs) - Workers:

Chemical Name	Inhalation-Acute (local)	Inhalation-Acute (systemic)	Inhalation-Long Term (local)	Inhalation-Long Term (systemic)
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	N/E	N/E	13.3 mg/m3	13.3 mg/m3

Chemical Name	Dermal-Acute (local)	Dermal-Acute (systemic)	Dermal-Long Term (local)	Dermal-Long Term (systemic)
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	3.5 mg/cm2	N/E	3.5 mg/cm2	2.21 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

Chemical Name	Freshwater	Marine water	Intermittent releases	Soil
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	0.0012 mg/L	0.00012 mg/L	0.012 mg/L	0.0071 mg/kg soil dw

Chemical Name	Sediment (freshwater)	Sediment (marine)	STP	Oral
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	0.0404 mg/kg sediment dw	0.00404 mg/kg sediment dw	3.66 mg/L	no potential to bioconcentrate

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

2-METHYL-3-PHENYLACRYLALDEHYDE: DNEL (Derived No Effect Level) for the general population:
- Inhalation, systemic effects, long-term: 3.27 mg/m3
- Inhalation, local effects, long-term: 3.27 mg/m3
- Dermal, systemic effects, long-term: 1.11 mg/kg bw/day
- Dermal, local effects, long-term: 3.5 mg/cm2
- Dermal, local effects, acute: 3.5 mg/cm2
- Oral, systemic effects, long-term: 1.1 mg/kg bw/day

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). Suggested materials for protective gloves: Butyl rubber, Nitrile rubber, PVC. The protective gloves to be used must comply with the specifications of the EC directive 89/686/EEC and the resultant 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: Respiratory protection is not needed with proper ventilation. 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. Gas mask with filter Type A.

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:

Form:	Liquid	**pH:**	Not Available
Appearance:	Clear yellow	**Relative density:**	1.036-1.040 (20 °C)
Odour:	Almond-like	**Partition coefficient (n-octanol/water):**	2.471 @ 25°C
Odour threshold:	Not Available	**% Volatile by weight:**	100%
Solubility in water:	Negligible	**VOC:**	Not Available
Evaporation rate:	Not Available	**Boiling point °C:**	254°C @ 101.3 kPa
Vapour pressure:	<0.01 kPa (<0.1 mm Hg) @ 20°C	**Boiling point °F:**	489°F @ 101.3 kPa
Vapour density:	Not Available	**Flash point:**	120 °C (248 °F) Pensky-Marten Closed Cup
Viscosity:	4.156 mPa.s @ 20°C	**Autoignition temperature:**	248°C (478°F)
Melting point/Freezing point:	<1.8°C (<35°F) @ 101.3 kPa	**Flammability (solid, gas):**	Not Applicable (liquid)
Oxidising properties:	Not oxidizing	**Flammability or explosive limits:**	LFL/LEL: Not Available
Explosive properties:	Not explosive		UFL/UEL: Not Available
Decomposition temperature:	Not Available		

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. Readily undergoes oxidation by air.

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 strong bases and 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
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	N/E	N/E	2050 mg/kg	Rat/ adult	>5000 mg/kg	Rabbit/ adult

Skin corrosion/irritation: Not classified (based on available data, the classification criteria are not met).

Chemical Name	Skin irritation	Species
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	Non-irritant	Human

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

Chemical Name	Eye irritation	Species
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	Slight irritant	Rabbit/ adult

Respiratory or skin sensitization: Skin sensitization - Category 1.

Chemical Name	Skin sensitisation	Species
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	Sensitizer	Weight of evidence

Carcinogenicity: Not classified (based on available data, the classification criteria are not met). READ-ACROSS (CINNAMALDEHYDE): In a 2-year animal feeding study, Cinnamaldehyde was not carcinogenic; NOAEL (carcinogenicity), rat: 400 mg/kg bw/day.

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). 2-METHYL-3-PHENYLACRYLALDEHYDE: Ames tests, with and without activation: negative. Mutagenicity was negative in in-vivo genotoxicity assays.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). 2-METHYL-3-PHENYLACRYLALDEHYDE - READ-ACROSS/WEIGHT OF EVIDENCE: Reproductive toxicity, oral study in rats: NOAEL (no-observed adverse-effect-level) of 200 mg/kg bw/day. Developmental toxicity, oral, rats: NOAEL of 1200 mg/kg bw/day.

Specific target organ toxicity (STOT) - single exposure: Not classified (based on available data, the classification criteria are not met).

Specific target organ toxicity (STOT) - repeated exposure: Not classified (based on available data, the classification criteria are not met). 2-METHYL-3-PHENYLACRYLALDEHYDE: Repeated dose toxicity study: NOAEL (No-Observed-Adverse-Effect-Level), oral, rat (weight of evidence) - 110 mg/kg bw/day; NOAEL, dermal, rat (weight of evidence) - 110 mg/kg bw/day.

Aspiration hazard: Not classified (based on available data, the classification criteria are not met).

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

Chemical Name	Fish 96 hour LC50	Fish 96 hour LC50	Fish Chronic NOEC
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	1.2 mg/L (similar materials)	N/E	N/E

Chemical Name	Invertebrates 48 hour EC50	Invertebrates 24 hour EC50	Invertebrates Chronic NOEC
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	9.9 mg/L	N/E	N/E

Chemical Name	Algae 96 hour EC50	Algae 72 hour EC50	Algae Chronic NOEC
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	N/E	14.8 mg/L	EC10=6.1 mg/L

12.2. Persistence and degradability:

Chemical Name	Biodegradation
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	Readily biodegradable (OECD 301B)

12.3. Bioaccumulative potential:

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	N/E	2.471 @ 25°C

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
2-Methyl-3-phenylacrylaldehyde (α-Methylcinnamaldehyde)	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: N/A

14.2. UN proper shipping name:

Not regulated - See Bill of Lading for Details

14.3. Transport hazard class(es):

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

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

14.4. Packing group: N/A

14.5. Environmental hazards:

Marine pollutant: Not Applicable

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

SECTION 15: Regulatory information

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

Europe REACh (EC) 1907/2006: Applicable components are registered, exempt or otherwise compliant. For Europe REACH, CAS# 15174-47-7 (EC 701-219-0). REACh is only relevant to substances either manufactured or imported into the EU. Emerald Performance Materials has met its obligations under the REACh regulation. REACh information regarding this product is provided for informational purposes only. Each Legal Entity may have differing REACh obligations, depending on their place in the supply chain. For material manufactured outside of the EU, the importer of record must understand and meet their specific obligations under the regulation.

EU Authorizations and/or restrictions on use: Not Applicable

Other EU information: No Additional Information

National regulations: No Additional Information

Chemical inventories:

Regulation	Status
Australian Inventory of Chemical Substances (AICS):	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):	Y
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):	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; 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.

15.2. Chemical safety assessment:

A chemical safety assessment has been carried out for the substance or mixture.

SECTION 16: Other information

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

H317 May cause an allergic skin reaction.

Reason for revision: Changes in Section(s): 1, 3, 15

Evaulation method for classification of mixtures: Not Applicable (substance)

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
EU OELV: European Union Occupational Exposure Limit Value
EU IOELV: European Union Indicative Occupational Exposure Limit Value
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)

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 Performance Materials, LLC
1499 SE Tech Center Place, Suite 300
Vancouver, WA 98683
United States

Annex

Exposure Scenarios

Substance information:

Name of substance: α-Methylcinnamaldehyde.
EC# 202-938-5 / CAS# 101-39-3
REACH Registration number: 01-2119538797-21-0000

List of exposure scenarios:

ES1: Use at industrial sites - Use as an intermediate
ES2: Formulation - Formulation of fragrance compounds
ES3: Formulation - Formulation of fragranced end-products
ES4: Use at industrial sites - Industrial end-use of washing and cleaning products
ES5: Use by professional workers - Professional end- use of washing and cleaning products
ES6: Consumer use - Consumer end-use of washing and cleaning products (Indoors)
ES7: Consumer use - Consumer end-use of washing and cleaning products (Outdoors)
ES8: Use by professional workers - Professional use of polishes and wax blends
ES9: Consumer use - Consumer end-use of polishes and wax blends
ES10: Consumer use - Consumer end-use of air care products
ES11: Consumer use - Consumer end-use of biocides (Indoors)
ES12: Consumer use - Consumer end-use of biocides (Outdoors)
ES13: Use by professional workers - Professional end-use of cosmetics
ES14: Consumer use - Consumer end-use of cosmetics

General remarks:

The first tier environmental exposure assessments have at first instance been performed using EUSES 2.1 which is part of Chemical Safety Assessment and Reporting tool version 2.2 (CHESAR v2.2). 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.

The first tier worker exposure assessments have at first instance been performed using Worker TRA v3 which is part of Chemical Safety Assessment and Reporting tool version 2.2 (CHESAR v2.2).

The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.

Reference: IFRA REACH Exposure scenarios for Fragrance Substances. Version 2.1/11 December 2012.

Exposure scenario (1): Use at industrial sites - Use as an intermediate

1. Exposure scenario (1)

Short title of the exposure scenario:

Use at industrial sites - Use as an intermediate

List of use descriptors:

Sector of use category (SU): SU8
Product category (PC): PC19
Process category (PROC): PROC1, PROC2, PROC3, PROC8b
Environmental release category (ERC): ERC6a (SpERC IFRA 2.1a.v1)

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Use in closed process, no likelihood of exposure. Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems.
PROC2 Use in closed, continuous process with occasional controlled exposure. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
PROC3 Use in closed batch process (synthesis or formulation). Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be

expected.

Name of contributing environmental scenario and corresponding ERCs:

ERC6a Industrial use resulting in manufacture of another substance (use of intermediates). Use of intermediates in primarily the chemical industry using continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions, for the synthesis (manufacture) of other substances. For instance the use of chemical building blocks (feedstock) in the synthesis of agrochemicals, pharmaceuticals, monomers, etc.

Further explanations:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

Industrial application.

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:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance: Up to 100%. Physical state: liquid.
Frequency and duration of use/exposure:	Duration: - PROC1, PROC2, PROC3: <8 hours/day. - PROC8b: <4 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3: 240 cm2 (one hand, face side only). - PROC2: 480 cm2 (two hands, face side only). - PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature (for liquid): <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC8b: Semi-closed process with occasional controlled exposure. Local exhaust ventilation: Not required. Occupational Health and Safety Management System: Advanced.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Not required. Dermal protection:Yes (chemically resistant gloves conforming to EN374 with specific activity training) (Effectiveness Dermal: 95%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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. On-site wastewater treatment required.
Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Maximum daily use at a site: 24 ton/day. Maximum annual use at a site: 7200 tons/year. Percentage of tonnage used at regional scale: 100 %.
Frequency and duration of use:	Emission days: 300 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:	Industrial use. Release fraction to air from process (initial release): 0.00025; (final release): 0.00025. Local release rate: 6 kg/day (SpERC IFRA 2.1a.v1). Release fraction to wastewater from process (initial release): 0.00002; (final release): 0.000006. Local release rate: 0.144 kg/day (SpERC IFRA 2.1a.v1) Release fraction to soil from process (final release): 0.0 (SpERC IFRA 2.1a.v1). On-site treatment of wastewater: Physico-chemical treatment (Effectiveness Water: 70%).
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC3, PROC8a, PROC8b

Assessment method: CHESAR V2.2 Worker TRA v3. Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	0.686 mg/kg bw/day	0.31	PROC8b
Worker, long-term, systemic	Inhalation	5.482 mg/m3	0.412	PROC3, PROC8b
Worker, long-term, systemic	Combined routes	N/A	0.722	PROC8b
Worker, long-term, local	Dermal	0.05 mg/cm2	0.014	PROC8b
Worker, long-term, local	Inhalation	5.482 mg/m3	0.412	PROC3, PROC8b

Environment

Information for contributing scenario (2): ERC6a (SpERC IFRA 2.1a.v1)

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.0009719 mg/L	0.81	
Freshwater sediment	0.023 mg/kg dw	0.572	
Marine water	0.00009676 mg/L	0.806	
Marine water sediment	0.002 mg/kg dw	0.57	
Soil	0.004 mg/kg dw	0.598	
STP	0.009 mg/L	<0.01	
Man via environment	0.001 mg/m3 / 0.0005801 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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. Duration: PROC1, PROC2, PROC3: <8 hours/day. PROC8b: <4 hours/day. Dermal protection:Yes (chemically resistant gloves conforming to EN374 with specific activity training) (Effectiveness Dermal: 95%). Concentration of substance: Up to 100%.

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): Formulation - Formulation of fragrance compounds

1. Exposure scenario (2)

Short title of the exposure scenario:

Formulation - Formulation of fragrance compounds

List of use descriptors:

Process category (PROC): PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15
Environmental release category (ERC): ERC2 (spERC IFRA 2.1a.v1)

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Use in closed process, no likelihood of exposure. Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems.
PROC3 Use in closed batch process (synthesis or formulation). Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). Manufacture or formulation of chemical products or arti-cles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage.
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC9 Transfer of substance or preparation 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 of preparations. Mixing and blending of substances into (chemical) preparations in all types of formulating industries, such as paints and do-it-yourself products, pigment paste, fuels, household products (cleaning products), lubricants, etc.

Further explanations:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
Industrial application.
Generic exposure scenario: IFRA GES 1 (IU1).

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:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance: - PROC1, PROC3, PROC5, PROC8b, PROC15: >25%. - PROC8a, PROC9: 5-25%. Physical state: liquid.
Frequency and duration of use/exposure:	Duration: - PROC3, PROC5, PROC8a: <4 hours/day. - PROC1, PROC8b, PROC9: <1 hour/day. - PROC15: <15 minutes.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC5, PROC9: 480 cm2 (two hands, face side only). - PROC8a, PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature (for liquid): <= 40 °C.

Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC15: Good general ventilation (3-5 air changes per hour): 30%. - PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC3: Closed batch process with occasional controlled exposure. - PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC8a, PROC15: No. Local exhaust ventilation: Not required. Occupational Health and Safety Management System: Advanced.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Not required. Dermal protection: - PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (Effectiveness Dermal: 95%). - PROC15: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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. On-site wastewater treatment required.
Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Maximum daily use at a site: 2 ton/day. Maximum annual use at a site: 300 tons/year. Percentage of tonnage used at regional scale: 100 %.
Frequency and duration of use:	Emission days: 180 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:	Industrial use. Release fraction to air from process (initial release): 0.00025; (final release): 0.00025. Local release rate: 0.5 kg/day (SpERC IFRA 2.1a.v1). Release fraction to wastewater from process (initial release): 0.00002; (final release): 0.000006. Local release rate: 0.012 kg/day (SpERC IFRA 2.1a.v1) Release fraction to soil from process (final release): 0.0 (SpERC IFRA 2.1a.v1). On-site treatment of wastewater: Physico-chemical treatment (Effectiveness Water: 70%).
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC5, PROC8a, PROC8b

Assessment method: CHESAR V2.2 Worker TRA v3. Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	0.686 mg/kg bw/day	0.31	PROC5, PROC8b
Worker, long-term, systemic	Inhalation	6.578 mg/m3	0.495	PROC8a
Worker, long-term, systemic	Combined routes	N/A	0.722	PROC5
Worker, long-term, local	Dermal	0.1 mg/cm2	0.029	PROC5
Worker, long-term, local	Inhalation	6.578 mg/m3	0.495	PROC8a

Environment

Information for contributing scenario (2): ERC2 (spERC IFRA 2.1a.v1)

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.0001547 mg/L	0.129	
Freshwater sediment	0.004 mg/kg dw	0.091	
Marine water	0.00001504 mg/L	0.125	
Marine water sediment	0.0003576 mg/kg dw	0.089	
Soil	0.0003591 mg/kg dw	0.051	
STP	0.0007432 mg/L	<0.01	
Man via environment	0.00005921 mg/m3 / 0.00003069 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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. Duration: PROC3, PROC5, PROC8a: <4 hours/day. PROC1, PROC8b, PROC9: <1 hour/day. PROC15: <15 minutes. Dermal protection: PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (Effectiveness Dermal: 95%). PROC15: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). Concentration of substance: Up to 25%.

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): Formulation - Formulation of fragranced end-products

1. Exposure scenario (3)

Short title of the exposure scenario:

Formulation - Formulation of fragranced end-products

List of use descriptors:

Process category (PROC): PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15

Environmental release category (ERC): ERC2 (SpERC AISE 2.1g.v2).

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Use in closed process, no likelihood of exposure. Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems.

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

PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). Manufacture or formulation of chemical products or arti-cles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage.

PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.

PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing). Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.
PROC14 Production of preparations or articles by tabletting, compression, extrusion, pelletisation. Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predomi-nantly related to volatiles and/or generated fumes, dust may be formed as well.
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 of preparations. Mixing and blending of substances into (chemical) preparations in all types of formulating industries, such as paints and do-it-yourself products, pigment paste, fuels, household products (cleaning products), lubricants, etc.

Further explanations:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
Industrial application.
Generic exposure scenario: IFRA GES 2 (IU2).

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:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance: - PROC1, PROC3, PROC5, PROC8b, PROC15: 5-25%. - PROC8a, PROC9, PROC14: <1%. Physical state: liquid.
Frequency and duration of use/exposure:	Duration: - PROC14: <8 hours/day. - PROC3, PROC5, PROC8a: <4 hours/day. - PROC1, PROC8b, PROC9: <1 hour/day. - PROC15: <15 minutes.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC5, PROC9, PROC14: 480 cm2 (two hands, face side only). - PROC8a, PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature (for liquid): <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC15: Good general ventilation (3-5 air changes per hour): 30%. - PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC3: Closed batch process with occasional controlled exposure. - PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC8a, PROC14, PROC15: No. Local exhaust ventilation: Not required. Occupational Health and Safety Management System: Advanced.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Not required. Dermal protection: - PROC1, PROC3, PROC8a, PROC9, PROC14, PROC15: No (Effectiveness Dermal: 0%). - PROC5: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%). - PROC8b: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Maximum daily use at a site: 1.5 ton/day. Maximum annual use at a site: 15 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): 0.0; (final release): 0.0. Local release rate: 0 kg/day (SpERC AISE 2.1g.v2). Release fraction to wastewater from process (initial release): 0.0001; (final release): 0.0001. Local release rate: 0.15 kg/day (SpERC AISE 2.1g.v2) Release fraction to soil from process (final release): 0.0 (SpERC AISE 2.1g.v2).
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Dry sludge application to agricultural soil: Yes (default). Process efficiency: Process optimized for highly efficient use of raw materials (very minimal environmental release). Equipment cleaning: Equipment cleaning with minimized emissions to wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Efficiency=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC3, PROC5, PROC8b

Assessment method: No Information

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1.645 mg/kg bw/day	0.744	PROC8b
Worker, long-term, systemic	Inhalation	3.289 mg/m3	0.247	PROC5
Worker, long-term, systemic	Combined routes	N/A	0.827	PROC8b
Worker, long-term, local	Dermal	0.12 mg/cm2	0.034	PROC3, PROC5, PROC8b
Worker, long-term, local	Inhalation	3.289 mg/m3	0.247	PROC5

Environment

Information for contributing scenario (2): ERC2 (SpERC AISE 2.1g.v2).

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes

Compartment	PEC	RCR	Notes
Freshwater	0.001 mg/L	0.841	
Freshwater sediment	0.024 mg/kg dw	0.594	
Marine water	0.0001005 mg/L	0.837	
Marine water sediment	0.002 mg/kg dw	0.591	
Soil	0.004 mg/kg dw	0.584	
STP	0.009 mg/L	<0.01	
Man via environment	0.000002091 mg/m3 / 0.00002135 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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. Duration: PROC14: <8 hours/day. PROC3, PROC5, PROC8a: <4 hours/day. PROC1, PROC8b, PROC9: <1 hour/day. PROC15: <15 minutes. Dermal protection: PROC1, PROC3, PROC8a, PROC9, PROC14: No (Effectiveness Dermal: 0%). PROC5: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%). PROC8b: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). Concentration of substance: PROC1, PROC3, PROC5, PROC8b, PROC15: 5-25%. PROC8a, PROC9, PROC14: <1%.

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): Use at industrial sites - Industrial end-use of washing and cleaning products

1. Exposure scenario (4)

Short title of the exposure scenario:

Use at industrial sites - Industrial end-use of washing and cleaning products

List of use descriptors:

Sector of use category (SU): SU0
Product category (PC): PC35
Process category (PROC): PROC1, PROC2, PROC4, PROC7, PROC8b, PROC10, PROC13
Environmental release category (ERC): ERC4

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Use in closed process, no likelihood of exposure. Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems.
PROC2 Use in closed, continuous process with occasional controlled exposure. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
PROC7 Industrial spraying. Air dispersive techniques. Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting. Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC10 Roller application or brushing. Low energy spreading of e.g. coatings. Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
PROC13 Treatment of articles by dipping and pouring. Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy tech-niques such as dipping the article into a bath or pouring a preparation onto a surface.

Name of contributing environmental scenario and corresponding ERCs:

ERC4 Industrial use of processing aids in processes and products, not becoming part of articles. Industrial use of processing aids in continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions.

For example, solvents used in chemical reactions or the 'use' of solvents during the application of paints, lubricants in metal working fluids, anti-set off agents in polymer moulding/casting.

Further explanations:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
Industrial application.
Generic exposure scenario: IFRA GES 3 (IU3).

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:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance: Up to 1%. Physical state: liquid.
Frequency and duration of use/exposure:	Duration: - PROC1, PROC2, PROC4, PROC7, PROC8b, PROC10: <8 hours/day. - PROC13: <4 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1: 240 cm2 (one hand, face side only). - PROC2, PROC4, PROC13: 480 cm2 (two hands, face side only). - PROC8b, PROC10: 960 cm2 (two hands). - PROC7: 1500 cm2 (two hands and upper wrists).
Other given operational conditions affecting workers exposure:	Location: - PROC1, PROC2, PROC7, PROC13: Indoor use. - PROC4, PROC8b, PROC10: Outdoor use. Domain: Industrial use. Process temperature (for liquid): <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Basic general ventilation (1-3 air changes per hour): 0%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC4, PROC8b: Semi-closed process with occasional controlled exposure. - PROC7, PROC10, PROC13: No. Local exhaust ventilation: - PROC1, PROC2, PROC4, PROC8b, PROC13: Not required. - PROC7: Yes (95% effectiveness). Occupational Health and Safety Management System: Advanced.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Not required. Dermal protection: - PROC1, PROC2, PROC4, PROC8b, PROC13: No (Effectiveness Dermal: 0%). - PROC7, PROC10: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Maximum daily use at a site: 0.0000275 ton/day. Maximum annual use at a site: 0.5 tons/year. Percentage of tonnage used at regional scale: 10 %.

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:	Industrial use. Indoor use. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.027 kg/day. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.027 kg/day. 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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC8b, PROC10, PROC13

Assessment method: CHESAR V2.2 Worker TRA v3. Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1.371 mg/kg bw/day	0.62	PROC8b, PROC13
Worker, long-term, systemic	Inhalation	4.264 mg/m3	0.321	PROC10
Worker, long-term, systemic	Combined routes	N/A	0.895	PROC13
Worker, long-term, local	Dermal	0.2 mg/cm2	0.057	PROC13
Worker, long-term, local	Inhalation	4.264 mg/m3	0.321	PROC10

Environment

Information for contributing scenario (2): ERC4

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.0002506 mg/L	0.209	
Freshwater sediment	0.006 mg/kg dw	0.148	
Marine water	0.00002464 mg/L	0.205	
Marine water sediment	0.0005858 mg/kg dw	0.145	
Soil	0.0008481 mg/kg dw	0.12	
STP	0.002 mg/L	<0.01	
Man via environment	0.0003829 mg/m3 / 0.0007436 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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. Duration: PROC1, PROC2, PROC4, PROC7, PROC8b, PROC10: <8 hours/day. PROC13: <4 hours/day. Dermal protection: PROC1, PROC2, PROC4, PROC8b, PROC13: No (Effectiveness Dermal: 0%). PROC7, PROC10: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). Local exhaust ventilation: PROC1, PROC2, PROC4, PROC8b, PROC13: Not required. PROC7: Yes (95% effectiveness).
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): Use by professional workers - Professional end- use of washing and cleaning products

1. Exposure scenario (5)

Short title of the exposure scenario:

Use by professional workers - Professional end- use of washing and cleaning products

List of use descriptors:

Sector of use category (SU): SU0
Product category (PC): PC35
Process category (PROC): PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13
Environmental release category (ERC): ERC8a

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Use in closed process, no likelihood of exposure. Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems.
PROC2 Use in closed, continuous process with occasional controlled exposure. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in non-dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC10 Roller application or brushing. Low energy spreading of e.g. coatings. Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
PROC11 Non industrial spraying. Air dispersive techniques. Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting. Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.
PROC13 Treatment of articles by dipping and pouring. Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy tech-niques such as dipping the article into a bath or pouring a preparation onto a surface.

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
Professional application.
Generic exposure scenario: IFRA GES 4 (IU4).

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:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.

Product characteristics:	Concentration of substance: Up to 1%. Physical state: liquid.
Frequency and duration of use/exposure:	Duration: - PROC1, PROC2, PROC4, PROC8b: <8 hours/day. - PROC8a, PROC10, PROC13: <4 hours/day. - PROC11: <1 hour/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1: 240 cm2 (one hand, face side only). - PROC2, PROC4, PROC13: 480 cm2 (two hands, face side only). - PROC8a, PROC8b, PROC10: 960 cm2 (two hands). - PROC11: 1500 cm2 (two hands and upper wrists).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Professional use. Process temperature (for liquid): <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC1, PROC2, PROC4, PROC10, PROC11, PROC13: Basic general ventilation (1-3 air changes per hour): 0%. - PROC8b: Good general ventilation (3-5 air changes per hour): 30%. - PROC8a: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC4, PROC8b: Semi-closed process with occasional controlled exposure. - PROC8a, PROC10, PROC11, PROC13: No. 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, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13: Not required. - PROC11: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). Dermal protection: - PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC13: No (Effectiveness Dermal: 0%). - PROC10: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). - PROC11: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.0000275 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide 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:	Professional use. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.027 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC8a, PROC8b, PROC10, PROC11, PROC13

Assessment method: CHESAR V2.2 Worker TRA v3. Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1.371 mg/kg bw/day	0.62	PROC8a, PROC8b, PROC13
Worker, long-term, systemic	Inhalation	9.137 mg/m3	0.687	PROC10
Worker, long-term, systemic	Combined routes	N/A	0.943	PROC11
Worker, long-term, local	Dermal	0.2 mg/cm2	0.057	PROC13
Worker, long-term, local	Inhalation	9.137 mg/m3	0.687	PROC10

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.0002506 mg/L	0.209	
Freshwater sediment	0.006 mg/kg dw	0.148	
Marine water	0.00002464 mg/L	0.205	
Marine water sediment	0.0005858 mg/kg dw	0.145	
Soil	0.0007749 mg/kg dw	0.109	
STP	0.002 mg/L	<0.01	
Man via environment	0.000002104 mg/m3 / 0.00001971 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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. Duration: PROC1, PROC2, PROC4, PROC8b: <8 hours/day. PROC8a, PROC10, PROC13: <4 hours/day. PROC11: <1 hour/day. Dermal protection: PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC13: No (Effectiveness Dermal: 0%). PROC10: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). PROC11: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%). Respiratory protection: PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13: Not required. PROC11: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). Concentration of substance: Up to 1%.
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 (6): Consumer use - Consumer end-use of washing and cleaning products (Indoors)

1. Exposure scenario (6)

Short title of the exposure scenario:

Consumer use - Consumer end-use of washing and cleaning products (Indoors)

List of use descriptors:

Product category (PC): PC35

Environmental release category (ERC): ERC8a

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

Consumer application.

Generic exposure scenario: IFRA GES 6 (IU6).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Product characteristics:	Concentration of substance in mixture: Up to 0.001 g/g. Physical state: liquid.
Amounts used:	Applied amounts for each use event: 50 g.
Frequency and duration of use/exposure:	Duration covers exposure up to: 60 minutes/event. Frequency - covers use frequency: up to 1 time/day; 365 times/year.
Human factors not influenced by risk management:	Exposed skin surface: Hands. Dermal transfer factor=1.

2.2 Control of environmental exposure

Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.00002475 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide 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. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.025 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PC35

Assessment method: CHESAR V2.2 Consumer TRA v3.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Consumer, long-term, systemic	Dermal	0.143 mg/kg bw/day	0.129	
Consumer, long-term, systemic	Inhalation	0.156 mg/m3	0.048	
Consumer, long-term, systemic	Oral	0 mg/kg bw/day	<0.01	
Consumer, long-term, systemic	Combined routes	N/A	0.177	
Consumer, long-term, local	Inhalation	0.156 mg/m3	0.048	

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.0002336 mg/L	0.195	
Freshwater sediment	0.006 mg/kg dw	0.138	
Marine water	0.00002293 mg/L	0.191	
Marine water sediment	0.0005453 mg/kg dw	0.135	
Soil	0.0006992 mg/kg dw	0.098	
STP	0.002 mg/L	<0.01	
Man via environment	0.000002102 mg/m3 / 0.00001839 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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.

Exposure scenario (7): Consumer use - Consumer end-use of washing and cleaning products (Outdoors)

1. Exposure scenario (7)

Short title of the exposure scenario:

Consumer use - Consumer end-use of washing and cleaning products (Outdoors)

List of use descriptors:

Product category (PC): PC35

Environmental release category (ERC): ERC8a, ERC8d

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

ERC8d Wide dispersive outdoor use of processing aids in open systems. Outdoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment, for example, automotive and bicycle care products (polishes, lubricants, de-icers, detergents), solvents in paints and adhesives.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

Consumer application.

Generic exposure scenario: IFRA GES 6 (IU6).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Product characteristics:	Concentration of substance in mixture: Up to 0.001 g/g. Physical state: liquid.
Amounts used:	Applied amounts for each use event: 50 g.
Frequency and duration of use/exposure:	Duration covers exposure up to: 60 minutes/event. Frequency - covers use frequency: up to 1 time/day; 365 times/year.
Human factors not influenced by risk management:	Exposed skin surface: Hands. Dermal transfer factor=1.

2.2 Control of environmental exposure

Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.00000275 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide 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:	Outdoor use. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.003 kg/day. Release fraction to soil from process (final release): 0.20.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PC35

Assessment method: CHESAR V2.2 Consumer TRA v3.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Consumer, long-term, systemic	Dermal	0.143 mg/kg bw/day	0.129	
Consumer, long-term, systemic	Inhalation	0.156 mg/m3	0.048	
Consumer, long-term, systemic	Oral	0 mg/kg bw/day	<0.01	
Consumer, long-term, systemic	Combined routes	N/A	0.177	
Consumer, long-term, local	Inhalation	0.156 mg/m3	0.048	

Environment

Information for contributing scenario (2): ERC8a, PROC8d

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.00009742 mg/L	0.081	
Freshwater sediment	0.002 mg/kg dw	0.057	

Compartment	PEC	RCR	Notes
Marine water	0.000009314 mg/L	0.078	
Marine water sediment	0.0002215 mg/kg dw	0.055	
Soil	0.00009345 mg/kg dw	0.013	
STP	0.0001703 mg/L	<0.01	
Man via environment	0.000002091 mg/m3 / 0.00000782 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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.

Exposure scenario (8): Use by professional workers - Professional use of polishes and wax blends

1. Exposure scenario (8)

Short title of the exposure scenario:

Use by professional workers - Professional use of polishes and wax blends

List of use descriptors:

Sector of use category (SU): SU0
Product category (PC): PC31
Process category (PROC): PROC2, PROC8a, PROC8b, PROC10, PROC11.
Environmental release category (ERC): ERC8a

List of names of contributing worker scenarios and corresponding PROCs:

PROC2 Use in closed, continuous process with occasional controlled exposure. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in non-dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC10 Roller application or brushing. Low energy spreading of e.g. coatings. Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
PROC11 Non industrial spraying. Air dispersive techniques. Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting. Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
Professional application.
Generic exposure scenario: IFRA GES 5 (IU5).

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: Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.

Product characteristics:	Concentration of substance: Up to 1%. Physical state: liquid.
Frequency and duration of use/exposure:	Duration: - PROC2, PROC8b: <8 hours/day. - PROC8a, PROC10: <4 hours/day. - PROC11: <1 hour/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC2: 480 cm2 (two hands, face side only). - PROC8a, PROC8b, PROC10: 960 cm2 (two hands). - PROC11: 1500 cm2 (two hands and upper wrists).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Professional use. Process temperature (for liquid): <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC2, PROC10: Basic general ventilation (1-3 air changes per hour): 0%. - PROC8b: Good general ventilation (3-5 air changes per hour): 30%. - PROC8a, PROC11: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC2: Closed continuous process with occasional controlled exposure. - PROC8b: Semi-closed process with occasional controlled exposure. - PROC8a, PROC10, PROC11: No. 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: Not required. Dermal protection: - PROC2, PROC8a, PROC8b: No (Effectiveness Dermal: 0%). - PROC10: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). - PROC11: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.000006875 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Professional use. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.007 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC8a, PROC8b, PROC10

Assessment method: CHESAR V2.2 Worker TRA v3. Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1.371 mg/kg bw/day	0.62	PROC8a, PROC8b
Worker, long-term, systemic	Inhalation	9.137 mg/m3	0.687	PROC10
Worker, long-term, local	Dermal	0.1 mg/cm2	0.029	PROC8a, PROC8b
Worker, long-term, local	Inhalation	9.137 mg/m3	0.687	PROC10
Worker, long-term, local	Combined routes	N/A	0.941	PROC8b

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.000123 mg/L	0.103	
Freshwater sediment	0.003 mg/kg dw	0.072	
Marine water	0.00001187 mg/L	0.099	
Marine water sediment	0.0002822 mg/kg dw	0.07	
Soil	0.000207 mg/kg dw	0.029	
STP	0.0004258 mg/L	<0.01	
Man via environment	0.000002093 mg/m3 / 0.000009802 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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. Duration: PROC2, PROC8b: <8 hours/day. PROC8a, PROC10: <4 hours/day. PROC11: <1 hour/day. Dermal protection: PROC2, PROC8a, PROC8b: No (Effectiveness Dermal: 0%). PROC10: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). PROC11: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%). Concentration of substance: Up to 1%.
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 (9): Consumer use - Consumer end-use of polishes and wax blends

1. Exposure scenario (9)

Short title of the exposure scenario:

Consumer use - Consumer end-use of polishes and wax blends

List of use descriptors:

Product category (PC): PC31

Environmental release category (ERC): ERC8a

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Consumer application.
Generic exposure scenario: IFRA GES 9 (IU9).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Product characteristics:	Concentration of substance in mixture: Up to 0.001 g/g. Physical state: liquid.
Amounts used:	Applied amounts for each use event: 550 g.
Frequency and duration of use/exposure:	Duration covers exposure up to: 4 hours/event. Frequency - covers use frequency: up to 1 time/day; 365 times/year.
Human factors not influenced by risk management:	Exposed skin surface: Hands. Dermal transfer factor=1.

2.2 Control of environmental exposure

Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.000006875 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.007 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PC31

Assessment method: CHESAR V2.2 Consumer TRA v3.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Consumer, long-term, systemic	Dermal	0.143 mg/kg bw/day	0.129	

	Route	Exposure estimate	RCR	Notes
Consumer, long-term, systemic	Inhalation	0.809 mg/m3	0.247	
Consumer, long-term, systemic	Oral	0 mg/kg bw/day	<0.01	
Consumer, long-term, systemic	Combined routes	N/A	0.376	
Consumer, long-term, local	Inhalation	0.809 mg/m3	0.247	

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.000123 mg/L	0.103	
Freshwater sediment	0.003 mg/kg dw	0.072	
Marine water	0.00001187 mg/L	0.099	
Marine water sediment	0.0002822 mg/kg dw	0.07	
Soil	0.000207 mg/kg dw	0.029	
STP	0.0004258 mg/L	<0.01	
Man via environment	0.000002093 mg/m3 / 0.000009802 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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.

Exposure scenario (10): Consumer use - Consumer end-use of air care products

1. Exposure scenario (10)

Short title of the exposure scenario:

Consumer use - Consumer end-use of air care products

List of use descriptors:

Product category (PC): PC3

Environmental release category (ERC): ERC8a

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

Consumer application.

Generic exposure scenario: IFRA GES 7 (IU7).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Product characteristics:	Concentration of substance in mixture: - Air care products (aerosol): Up to 0.002 g/g. - Air care products, continous action (solid and liquid): Up to 0.05 g/g. Physical state: liquid.

Amounts used:	Applied amounts for each use event: 50 g.
Frequency and duration of use/exposure:	Duration covers exposure up to: 8 hours/event. Frequency - covers use frequency: up to 1 time/day; 365 times/year.
2.2 Control of environmental exposure	
Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.000066 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.066 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PC3

Assessment method: CHESAR V2.2 Consumer TRA v3.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Consumer, long-term, systemic	Dermal	0 mg/kg bw/day	<0.01	
Consumer, long-term, systemic	Inhalation	2.155 mg/m3	0.659	
Consumer, long-term, systemic	Oral	0 mg/kg bw/day	<0.01	
Consumer, long-term, systemic	Combined routes	N/A	0.659	
Consumer, long-term, local	Inhalation	2.155 mg/m3	0.659	

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.000489 mg/L	0.408	
Freshwater sediment	0.012 mg/kg dw	0.288	
Marine water	0.00004847 mg/L	0.404	
Marine water sediment	0.001 mg/kg dw	0.285	
Soil	0.002 mg/kg dw	0.258	
STP	0.004 mg/L	<0.01	
Man via environment	0.000002123 mg/m3 / 0.00003821 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral

Compartment	PEC	RCR	Notes
Man via environment-Combined routes	N/A	<0.01	

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.

Exposure scenario (11): Consumer use - Consumer end-use of biocides (Indoors)

1. Exposure scenario (11)

Short title of the exposure scenario:

Consumer use - Consumer end-use of biocides (Indoors)

List of use descriptors:

Product category (PC): PC8

Environmental release category (ERC): ERC8a

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

Consumer application.

Generic exposure scenario: IFRA GES 8 (IU8).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

2.2 Control of environmental exposure

Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.00000275 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Indoor use. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.003 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

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 practive advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.00009742 mg/L	0.081	
Freshwater sediment	0.002 mg/kg dw	0.057	
Marine water	0.000009314 mg/L	0.078	
Marine water sediment	0.0002215 mg/kg dw	0.055	
Soil	0.00009345 mg/kg dw	0.013	
STP	0.0001703 mg/L	<0.01	
Man via environment	0.000002091 mg/m3 / 0.00000782 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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

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 (12): Consumer use - Consumer end-use of biocides (Outdoors)

1. Exposure scenario (12)

Short title of the exposure scenario:

Consumer use - Consumer end-use of biocides (Outdoors)

List of use descriptors:

Product category (PC): PC8

Environmental release category (ERC): ERC8a, ERC8d

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

ERC8d Wide dispersive outdoor use of processing aids in open systems. Outdoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment, for example, automotive and bicycle care products (polishes, lubricants, de-icers, detergents), solvents in paints and adhesives.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

Consumer application.

Generic exposure scenario: IFRA GES 8 (IU8).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

2.2 Control of environmental exposure

Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.

Amounts used:	Daily wide dispersive use: 0.00000275 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Outdoor use. Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.003 kg/day. Release fraction to soil from process (final release): 0.20.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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 practive advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Environment

Information for contributing scenario (2): ERC8a, PROC8d

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.00009742 mg/L	0.081	
Freshwater sediment	0.002 mg/kg dw	0.057	
Marine water	0.000009314 mg/L	0.078	
Marine water sediment	0.0002215 mg/kg dw	0.055	
Soil	0.00009345 mg/kg dw	0.013	
STP	0.0001703 mg/L	<0.01	
Man via environment	0.000002091 mg/m3 / 0.00000782 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0.01	

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

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 (13): Use by professional workers - Professional end-use of cosmetics

1. Exposure scenario (13)

Short title of the exposure scenario:

Use by professional workers - Professional end-use of cosmetics

List of use descriptors:

Product category (PC): PC28, PC39

Environmental release category (ERC): ERC8a

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use.

Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Professional application.
Generic exposure scenario: IFRA GES 10 (IU10).

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:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

2.2 Control of environmental exposure

General:	All risk management measures utilised must also comply with all relevant local regulations.
Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.000006875 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.007 kg/day. Release fraction to soil from process (final release): 0.0.
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=87.61%). 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. Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
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 practive advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Environment

Information for contributing scenario (2): ERC8a

Assessment method: CHESAR V2.2 - EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0.000123 mg/L	0.103	
Freshwater sediment	0.003 mg/kg dw	0.072	
Marine water	0.00001187 mg/L	0.099	
Marine water sediment	0.0002822 mg/kg dw	0.07	
Soil	0.000207 mg/kg dw	0.029	
STP	0.0004258 mg/L	<0.01	
Man via environment	0.000002093 mg/m3 / 0.000009802 mg/kg bw/day	<0.01 / <0.01	Inhalation / Oral

Compartment	PEC	RCR	Notes
Man via environment-Combined routes	N/A	<0.01	

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

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 (14): Consumer use - Consumer end-use of cosmetics

1. Exposure scenario (14)

Short title of the exposure scenario:

Consumer use - Consumer end-use of cosmetics

List of use descriptors:

Product category (PC): PC28, PC39
Environmental release category (ERC): ERC8a

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Wide dispersive indoor use of processing aids in open systems. Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, de-icers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.

Further explanations:

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
Consumer application.
Generic exposure scenario: IFRA GES 10 (IU10).

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 consumer exposure

General:	For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

2.2 Control of environmental exposure

Product characteristics:	Physical state: liquid. Vapour pressure: <0.5 kPa.
Amounts used:	Daily wide dispersive use: 0.000006875 tons/day. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Release fraction to air from process (initial release): 1.00; (final release): 1.00. Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.007 kg/day. Release fraction to soil from process (final release): 0.0.
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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

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.