Safety Data Sheet

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

Revision date: 2019-03-21

Supercedes: 2019-02-14

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

1.1. Product identifier:

Product trade name:	Kalama* C-10 Aldehyde FCC
Company product number:	C10A
REACH registration number:	01-2119967771-26-0005
Substance name:	Decanal
Substance identification number:	EC 203-957-4
Other means of identification:	1-Decanal; Decaldehyde; Decyl aldehyde

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

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

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

Manufacturer/Supplier:	Emerald Performance Materials, LLC 1499 SE Tech Center Place, Suite 300 Vancouver, WA 98683 United States Telephone: +1-360-954-7100 FAX: +1-360-954-7201
EU Only Representative:	Penman Consulting bvba Avenue des Arts 10 B-1210 Brussels Belgium Telephone: +32 (0) 2 305 0698 email: pcbvba09@penmanconsulting.com
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:

Eye Irritation, category 2, H319
Hazardous to the aquatic environment, Chronic, category 3, H412

2.2. Label elements:

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

Hazard pictogram(s):

Signal word:
Warning

Hazard statements:

H319 Causes serious eye irritation.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.

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
0000112-31-2	Decanal	98-100	Aquatic Chronic 3- Eye Irrit. 2	H319-412

CAS-No.	Chemical Name	Weight%	REACH Registration No.	EC/List Number
0000112-31-2	Decanal	98-100	01-2119967771-26-0005	203-957-4

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

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: Wash the affected area thoroughly with plenty of soap and water. Get medical attention if symptoms occur.

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 dry chemical, "alcohol" foam, carbon dioxide or water spray.

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

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Issue warning: combustible liquid. Eliminate all ignition sources. Ventilate the area. If spill is large, be prepared to isolate the hazard area. Deny access to the spill area to persons who are not involved in the cleanup and/or who have not been properly trained in spill management of hazardous/flammable liquids. Vapors may explode if ignited in an enclosed area. Run off to sewer may cause a fire or explosion hazard. Protect product from flames of any kind; maintain proper clearance when using heat devices, etc. Closed container may rupture (due to build up in pressure) when exposed to extreme heat. Product may burn if an ignition source is present. 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:

Use water/water spray to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures and to dilute spills to non-combustible mixtures. Do not flush combustible liquids into sewer as a fire or vapor explosion hazard may result. Never direct a hose stream directly onto a burning flammable/combustible liquid. Solid or straight hose stream will cause fire to spread if directed onto a burning spill or into an open container of burning liquid. 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. Eliminate ignition sources. Ventilate areas of spill. 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 contact. Avoid repeated or prolonged 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. Bond and ground all containers when transferring

chemical. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). Use spark-proof tools and equipment. Vapors may travel to distant ignition sources.

7.2. Conditions for safe storage, including any incompatibilities:

Store in combustible storage area and away from heat and open flame. Keep away from heat, sparks and open flames. Store under well-ventilated conditions. Keep container upright, when not in use, to prevent leakage. Avoid storing containers in direct sunlight as vapors may accumulate in the head space creating pressure. 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. Emptied container may contain residual vapors or liquid which may ignite or explode. Do not reuse empty container without commercial cleaning or reconditioning. Bond and ground all containers when transferring chemical. 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
Decanal	N/E	N/E	N/E	N/E

Chemical Name	UK WEL	Ireland OEL
Decanal	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):

Decanal

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	N/E	N/E	N/E	24,9 mg/m3
Workers	Dermal	N/E	N/E	N/E	7 mg/kg bw/day
General population	Inhalation	N/E	N/E	N/E	6,1 mg/m3
General population	Dermal	N/E	N/E	N/E	3,5 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	3,5 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

Decanal

Compartment	PNEC
Freshwater	1,17 µg/L
Freshwater sediment	4,6 µg/kg dw
Marine water	0,117 µg/L
Marine water sediment	0,46 µg/kg dw
Intermittent releases	11,7 µg/L
Soil	14,7 µg/kg dw
STP	3,16 mg/L
Oral	313 mg/kg food

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. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.).

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses or goggles required.

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 240 minutes (protection class 5 or greater) are recommended. For brief contact or splash applications, gloves with breakthrough times of 10 minutes or greater are recommended (protection class 1 or greater). 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.

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:	Colorless to light yellow	**Relative density:**	0.823-0.832 (25°C)
Odour:	Characteristic	**Partition coefficient (n-octanol/water):**	3.8 (OECD 117)
Odour threshold:	Not Available	**% Volatile by weight:**	Not Available
Solubility in water:	29.4 mg/L (20°C)	**VOC:**	Not Available
Evaporation rate:	Not Available	**Boiling point °C:**	209-216 °C
Vapour pressure:	8.2 Pa @ 20°C	**Boiling point °F:**	408-421 °F
Vapour density:	5.4 (Air=1)	**Flash point:**	82-93 °C (180-199 °F)
Viscosity:	1.6 mm2/s @ 40°C	**Autoignition temperature:**	195 °C (383 °F)
Melting point/Freezing point:	-3.6 °C (25.5 °F)	**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	**Surface tension:**	59.9 mN/m @ 20°C (2.8 mg/L)

9.2. Other information:

Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

10.1. Reactivity:

Presents no significant reactivity hazard. Neither pyrophoric nor reactive with water. Does not form explosive mixtures with other organic materials.

10.2. Chemical stability:

This product is stable. Normally stable even at elevated temperatures and pressures. Does not undergo explosive decomposition; is shock stable; and is not an oxygen donor. 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 acids, bases, and oxidizing agents. Avoid contact with reducing agents. Avoid contact with amines. May attack galvanized steel.

10.6. Hazardous decomposition products:

Carbon dioxide, carbon monoxide and hydrocarbons.

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: Causes serious eye irritation.

Skin: May be absorbed through the skin. May be harmful in contact with skin. 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: 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
Decanal	N/E	N/E	>5000 mg/kg	Rat/ adult	>4173 mg/kg	Rabbit/ adult

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

Chemical Name	Skin irritation	Species
Decanal	Mild irritant	Rabbit/ adult

Serious eye damage/irritation: Causes serious eye irritation - Category 2.

Chemical Name	Eye irritation	Species
Decanal	Irritant	Rabbit/ adult

Respiratory or skin sensitization: Not classified (based on available data, the classification criteria are not met).

Chemical Name	Skin sensitisation	Species
Decanal	Non-sensitizer	HRIPT (Human Repeat Insult Patch Test)

Carcinogenicity: Not classified (no relevant information found).

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). DECANAL-READ-ACROSS: Mutagenicity was negative in in-vivo genotoxicity assays. Mixed results were seen in in-vitro genotoxicity assays.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). DECANAL - READ-ACROSS/WEIGHT OF EVIDENCE: Reproductive toxicity, oral study in rats: NOAEL (no-observed adverse-effect-level) of 200 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). DECANAL-READ-ACROSS (DODECANAL): Repeated dose study, oral, rat: NOAEL (no-observed-adverse-effect-level) =1409.7 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:

DECANAL: Microorganism Toxicity (activated sludge, 3 hours): The acute EC50 is 70 mg/L, NOEC is 31.6 mg/L.

Chemical Name	Species	Acute	Acute	Chronic
Decanal	Fish	LC50 1.45 mg/L (96 hours) (geometric mean measured)	N/E	N/E
Decanal	Invertebrates	EC50 1.17 mg/L (48 hours) (geometric mean measured)	N/E	N/E
Decanal	Algae	EC50 4.5 mg/L (72 hours) (similar materials)	N/E	NOEC 0.759 mg/L(72 hours) (similar materials)

12.2. Persistence and degradability:

Chemical Name	Biodegradation
Decanal	Readily biodegradable (OECD 301F)

12.3. Bioaccumulative potential:

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
Decanal	112-339 l/kg (weight of evidence)	3.8 (OECD 117)

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
Decanal	794 (OECD 121)

12.5. Results of PBT and vPvB assessment:

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

12.6. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

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

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

SECTION 14: Transport information

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

14.1. UN number: UN3082

14.2. UN proper shipping name:

Environmentally hazardous substance, liquid, n.o.s. (Decaldehyde)

14.3. Transport hazard class(es):

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

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

14.4. Packing group: III

14.5. Environmental hazards:

Marine pollutant: IMDG Code/TDG Code Marine Pollutant: Decaldehyde. Not listed by U.S. DOT 49 CFR 172.101 Appendix B.

Hazardous substance (USA): Not Applicable

14.6. Special precautions for user:

Not Applicable

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

Not Applicable

Notes: For surface shipments within the United States, in containers of 119 gallons (450 L) or less: Not regulated. For shipments within the United States, in containers of more than 119 gallons: NA1993, Combustible liquid, N.O.S. (Decaldehyde), PG III.

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. 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) (Active):	Y

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

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):

H319	Causes serious eye irritation.
H412	Harmful to aquatic life with long lasting effects.

Reason for revision: Changes in Section(s): 9

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: Decanal.
EC# 203-957-4 / CAS# 112-31-2
REACH Registration number: 01-2119967771-26-0005

List of exposure scenarios:

ES1: Formulation of fragranced compounds (compounding)
ES2: Formulation of fragranced end-products
ES3: Industrial end-use of fragranced end-products
ES4: Professional end-use of fragranced end products
ES5: Consumer end-use of fragranced end products

General remarks:

This product is a liquid fragrance ingredient used in a wide variety of fragranced end-products, including washing, cleaning and cosmetic products. It functions as an odour agent. Formulated fragranced products for industrial, professional and consumer uses contain less than 1%. The neat substance is mixed with other fragrance ingredients to form a fragrance compound (compounding) followed by the formulation of the compound into a fragranced end-product (formulation). Reference: IFRA REACH Exposure scenarios for Fragrance Substances. Version 2.1/11 December 2012.

Exposure scenario (1): Formulation of fragranced compounds (compounding)

1. Exposure scenario (1)

Short title of the exposure scenario:

Formulation of fragranced compounds (compounding)

List of use descriptors:

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

List of names of contributing worker scenarios and corresponding PROCs:

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

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.
SpERC IFRA 2,1(a): Formulation of fragrance compounds at large/medium sites; SpERC IFRA 2,1(b): Formulation of fragrance compounds at small sites.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	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, PROC2, PROC3, PROC5, PROC8b: >25% - PROC8a, PROC9, PROC15: 5-25% Concentration of substance in compounds: The weight fraction of fragrance substances in compounds is highly variable and may be as high as 20% w/w (IFRA 2012). A reasonable maximum concentration of this substance in fragrance compounds is 3.01%. Physical state: liquid.
Amounts used:	Workers may handle amounts of fragrance substance in the kg-range per day.
Frequency and duration of use/exposure:	Duration: - PROC2, PROC3, PROC5, PROC8a: 1-4 hours/day. - PROC1, PROC8b, PROC9: 15 minutes-1 hour/day. - PROC15: <15 minutes. Frequency: <=220 days/year.
Human factors not influenced by risk management:	ECETOC developed values for typically affected skin surface areas for each process category which vary from 240 to 1980 cm2.
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Basic general ventilation (1-3 air changes per hour): 0%. Local exhaust ventilation: Not required.
Organisational measures to prevent/limit releases, dispersion and exposure:	Avoiding frequent and direct contact with substance. Minimisation of manual phases. Regular cleaning of equipment and work area. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Not required. Chemical safety goggles recommended. Dermal protection: - PROC1, PROC2, PROC3, PROC9, PROC15: No (Effectiveness Dermal: 0%). - PROC5, PROC8a, PROC8b: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (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:	Environmental release may vary depending on the size of the compounding site according to IFRA guideline (2012). It is not more than 0.5% of the use volume for smaller compounding sites, whereas for large/medium sites it is not more than 0.2%. The size of compounding sites was defined using data obtained in a questionnaire: small sites produce less than 1000 tonnes of compounds per year, medium sites produce between 1000 and 10,000 tonnes of compounds per year and large sites produce more than 10,000 tonnes of compounds per year (RIFM 2009).
Product characteristics:	Concentration of substance: Up to 100%. Concentration of substance in compounds: The weight fraction of fragrance substances in compounds is highly variable and may be as high as 20% w/w (IFRA 2012). A reasonable maximum concentration of this substance in fragrance compounds is 3.01%. Physical state: liquid.
Amounts used:	Maximum annual use at a site: 25 tons/year. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Emission days: 250 days/year.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (freshwater); >=198,000 m3/day (seawater).
Other given operational conditions affecting environmental exposure:	Indoor use. Industrial use. Release fraction to air from process: 0,025. Local release rate: 2,5 kg/day (ERC2). Release fraction to wastewater from process: 0.002 (large/medium site); 0.005 (small site). Local release rate: 0,2 kg/day (ERC2). Release fraction to soil from process: 0 (ERC2).

Technical conditions and measures at process level (source) to prevent release:	Sites have impermeable floors.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC5, PROC8a, PROC9

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	4,11 mg/kg bw/day	0,59	PROC9
Worker, long-term, systemic	Inhalation	16,41 mg/m3	0,66	PROC8a
Worker, long-term, systemic	Combined routes	N/A	0,94	PROC5

Environment

Information for contributing scenario (2): ERC2 (SpERC IFRA 2.1a.v1, IFRA 2.1b.v1)

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00111 mg/L	0.95	
Freshwater sediment	0,0201 mg/kg ww	0,95	
Marine water	0,000109 mg/L	0,936	
Marine water sediment	0,00198 mg/kg ww	0,93	
Soil	0,0000747 mg/kg ww	0,00452	
STP	0,0101 mg/L	0,00321	
Man via environment	0,000478 mg/m3 / 0,000451 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral

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 (2): Formulation of fragranced end-products

1. Exposure scenario (2)

Short title of the exposure scenario:

Formulation of fragranced end-products

List of use descriptors:

Product category (PC): PC3, PC8, PC28, PC31, PC35, PC39

Process category (PROC): PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15

Environmental release category (ERC): ERC2 (SpERC AISE and Cosmetics Europe (CE)).

List of names of contributing worker scenarios and corresponding PROCs:

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

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

Further explanations:

Fragrance compounds are used by several industries, such as the cosmetics industry or detergents industry, in the formulation of fragranced end-products. The compounds are combined with various other ingredients to make up the final fragranced products, such as washing and cleaning products, air care products, biocides, waxes and polishes and cosmetics.

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

Product characteristics:	Concentration of substance: - PROC1, PROC2, PROC3, PROC5, PROC8b, PROC15: 5-25% - PROC8a, PROC9, PROC14: <1% Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0.18%. Physical state: liquid.
Amounts used:	Workers may handle amounts of fragrance end-product in the kg-range per day.
Frequency and duration of use/exposure:	Duration: - PROC2, PROC3, PROC5, PROC8a: 1-4 hours/day. - PROC1, PROC8b, PROC9: 15 minutes-1 hour/day. - PROC14: >4 hours/day. - PROC15: <15 minutes. Frequency: <=220 days/year.
Human factors not influenced by risk management:	ECETOC developed values for typically affected skin surface areas for each process category which vary from 240 to 1980 cm2.
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Basic general ventilation (1-3 air changes per hour): 0%. Local exhaust ventilation: Not required.
Organisational measures to prevent/limit releases, dispersion and exposure:	Avoiding frequent and direct contact with substance. Minimisation of manual phases. Regular cleaning of equipment and work area. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Not required. Chemical safety goggles recommended. Dermal protection: - PROC1, PROC2, PROC3, PROC8a, PROC9, PROC14, PROC15: No (Effectiveness Dermal: 0%). - PROC5, PROC8b: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (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	
Product characteristics:	Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0.2%. Physical state: liquid.
Amounts used:	Amounts used in the EU: - AISE granular and low viscosity liquids: 37,5 tons/year (large site); 14 tons/year (medium site); 11,5 tons/year (small site). - AISE high viscosity liquids+CE/AISE solid products+CE low viscosity liquids: 10,5 tons/year (large site); 4,5 tons/year (medium/small site). - AISE + CE Fine fragrances (cleaning with solvent): 16 tons/year (large/medium/small site). - ERC2 default: 1,5 tons/year (large/medium/small site).
Frequency and duration of use:	Emission days: 250 days/year.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (freshwater); >=198,000 m3/day (seawater).
Other given operational conditions affecting environmental exposure:	Indoor use. Industrial use. Release fraction to air from process: 0. Release fraction to wastewater from process: - AISE granular and low viscosity liquids: 0,0001 (large site); 0,001 (medium site); 0,002 (small site). - AISE high viscosity liquids+CE/AISE solid products+CE low viscosity liquids: 0,001 (large site); 0,002 (medium site); 0,004 (small site). - AISE + CE Fine fragrances (cleaning with solvent): 0 (large/medium/small site). - ERC2 default: 0,02 (large/medium/small site). Release fraction to soil from process: 0.
Technical conditions and measures at process level (source) to prevent release:	Sites have impermeable floors.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC3, PROC4, PROC9

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

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

Route	Exposure estimate	RCR	Notes

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1,65 mg/kg bw/day	0,235	PROC5, PROC8b
Worker, long-term, systemic	Inhalation	11,72 mg/m3	0,471	PROC5
Worker, long-term, systemic	Combined routes	N/A	0,706	PROC5

Environment

Information for contributing scenario (2): ERC2 (SpERC AISE and Cosmetics Europe (CE)).

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,000707 mg/L	0,604	
Freshwater sediment	0,0128 mg/kg ww	0,604	
Marine water	0,0000689 mg/L	0,589	
Marine water sediment	0,00124 mg/kg ww	0,589	
Soil	0,0102 mg/kg ww	0,617	
STP	0,00609 mg/L	0,00193	
Man via environment	0,00000376 mg/m3 / 0,000246 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral

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 (3): Industrial end-use of fragranced end-products

1. Exposure scenario (3)

Short title of the exposure scenario:

Industrial end-use of fragranced end-products

List of use descriptors:

Product category (PC): PC3, PC8, PC28, PC31, PC35, PC39

Process category (PROC): PROC1, PROC2, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13

Environmental release category (ERC): ERC4 (SpERC AISE 4.1.v.1)

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.

PROC4 Chemical production where opportunity for exposure arises.

PROC7 Industrial spraying. Air dispersive techniques i.e. dispersion into air (= atomization) by e.g. pressurized air, hydraulic pressure or centrifugation, applicable for liquids and powders.

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.

PROC10 Roller application or brushing. This includes application of paints, coatings, removers, adhesives or cleaning agents to surfaces with potential exposure arising from splashes.

PROC13 Treatment of articles by dipping and pouring.

Name of contributing environmental scenario and corresponding ERCs:

ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article).

Further explanations:

Industrial use of Laundry products:

- CS1 Laundry detergent: Automatic process (PROC2, PROC8a, PROC8b).
- CS2 Conditioner (softener/starch): Automatic process (PROC2, PROC8a, PROC8b).
- CS3 Laundry aid (gasing): Automatic process (PROC2, PROC8a, PROC8b).
- CS4 Laundry aid (non-gasing): Automatic process (PROC2, PROC8a, PROC8b).

Industrial use of Vehicle cleaning Products:

- CS5 Train cleaner: Semi-Automatic process (PROC4, PROC8a, PROC8b).

- CS6 Aeroplane cleaner: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- CS7 Car wash product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- CS8 Car wash product: Spray and rinse process (PROC7, PROC8a, PROC8b).
- CS9 Car wash product: Spray and wipe manual process (PROC7, PROC8a, PROC8b, PROC10)
- CS10 Dewaxing product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- CS11 Boat cleaning: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- CS12 Boat cleaning: Spray and wipe manual process (PROC7, PROC8a, PROC8b).

Industrial use of Food beverage and pharmacos products:

- CS13 Food process cleaner: Cleaning In Place process (PROC1, PROC8a, PROC8b).
- CS14 Food process cleaner: Semi closed cleaning process (PROC4, PROC8a, PROC8b).
- CS15 Chain maintenance product: Automatic spray process (PROC7, PROC8a, PROC8b).
- CS16 Chain maintenance product: Automatic drip and brush process (PROC13).
- CS17 Defoaming product: Automatic process (PROC1, PROC8a, PROC8b).
- CS18 Foam cleaner: Semi-Automatic with venting process (PROC7, PROC8a, PROC8b).
- CS19 Foam cleaner: Semi-Automatic without venting process (PROC7, PROC8a, PROC8b).
- CS20 Animal housing care: Semi-Automatic process (PROC7, PROC8a, PROC8b).
- CS21 Disinfection product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- CS22 Disinfection product: Fogging and gassing Semi-automatic process (PROC7, PROC8a, PROC8b).

Industrial use of Water treatment products:

- CS23 Preservation and sanitation agent: drink and pool water: (PROC4, PROC8a, PROC8b).
- CS24 Preservation and sanitation agent: waste water: (PROC4, PROC8a, PROC8b).

Industrial Use of Facade/surface Cleaning Products:

- CS25 Facade/surface cleaner: High pressure process (PROC4, PROC8a, PROC8b).
- CS26 Facade/surface cleaner: Medium pressure process (PROC4, PROC8a, PROC8b).

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

Product characteristics:	Concentration of substance: <1%. Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0.18%. Physical state: liquid (PROC1, PROC2, PROC4, PROC7, PROC10, PROC13); liquid and solid (PROC8a, PROC8b).
Amounts used:	Workers may handle amounts of fragrance end-product in the kg-range per day.
Frequency and duration of use/exposure:	Duration: - PROC1, PROC2, PROC4 (CS5-CS7, CS10, CS14, CS23-CS26), PROC7 (CS15, CS18-CS20, CS22), PROC10, PROC13: >4 hours. - PROC4 (CS21): 1-4 hours. - PROC7 (CS8, CS9, CS12), PROC8a/PROC8b (CS5-CS12, CS18-CS22): 15 minutes-1 hour. - PROC8a/PROC8b (CS1-CS4, CS13-CS15, CS17, CS23-CS26): <15 minutes. Frequency: <=240 days/year.
Human factors not influenced by risk management:	ECETOC developed values for typically affected skin surface areas for each process category which vary from 240 to 1980 cm2.
Other given operational conditions affecting workers exposure:	Location: Unless otherwise stated, Indoor use. - PROC4 (CS23-CS26), PROC7 (CS9, CS12), PROC8a/PROC8b (CS9, CS11, CS12, CS23-CS26), PROC10: Outdoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Unless otherwise stated, Basic general ventilation (1-3 air changes per hour): 0%. - PROC4 (CS23-CS26), PROC7 (CS9, CS12), PROC8a/PROC8b (CS9, CS11, CS12, CS23-CS26), PROC10: Not relevant. Local exhaust ventilation: Unless otherwise stated, Not required. - PROC13: Yes (90% effectiveness). - PROC7 (CS18), PROC8a/PROC8b (CS18): Yes (95% effectiveness).

Organisational measures to prevent/limit releases, dispersion and exposure:	Avoiding frequent and direct contact with substance. Minimisation of manual phases. Regular cleaning of equipment and work area. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Unless otherwise stated, Not required. - PROC4 (CS25, CS26), PROC7 (CS15, CS19, CS20, CS22): Yes (mimimum efficiency inhalation: 90%). Chemical safety goggles recommended. Dermal protection: Unless otherwise stated, No (Effectiveness Dermal: 0%). - PROC4 (CS10, CS14, CS25, CS26), PROC7, PROC8a/PROC8b (CS1-CS15, CS17-CS19, CS22-CS26), PROC10, PROC13: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (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:	Industrial use is considered as wide dispersive use together with the other end-uses of fragranced products. Industrial end-use products are similar to those used by professionals and consumers and releases will be to the waste water stream (IFRA 2012).
Product characteristics:	Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0.2%. Physical state: liquid.
Amounts used:	Daily wide dispersive use: 254,5 kg/day. Amounts used in the EU: 92892 kg/year. Fraction of regional tonnage used locally: 0.00075.
Frequency and duration of use:	Emission days: <=365 days/year. Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (freshwater); >=198,000 m3/day (seawater).
Other given operational conditions affecting environmental exposure:	Industrial use. Release fraction to air from process: 0. Release fraction to wastewater from process: 1.0. Local release rate: 0,191 kg/day (SpERC AISE 4.1.v1) Release fraction to soil from process: 0.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC7

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

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

Route	Exposure estimate	RCR	Notes

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	0,86 mg/kg bw/day	0,1224	PROC7
Worker, long-term, systemic	Inhalation	13,02 mg/m3	0,523	PROC7
Worker, long-term, systemic	Combined routes	N/A	0,6454	PROC7

Environment

Information for contributing scenario (2): ERC4 (SpERC AISE 4.1.v.1).

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00107 mg/L	0,911	
Freshwater sediment	0,0192 mg/kg ww	0,911	
Marine water	0,000105 mg/L	0,896	
Marine water sediment	0,00186 mg/kg ww	0,881	
Soil	0,0162 mg/kg ww	0,983	
STP	0,00968 mg/L	0,00306	
Man via environment	0,00000578 mg/m3 / 0,000753 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral

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 (4): Professional end-use of fragranced end products

1. Exposure scenario (4)

Short title of the exposure scenario:

Professional end-use of fragranced end products

List of use descriptors:

Product category (PC): PC3, PC8, PC28, PC31, PC35, PC39

Process category (PROC): PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13

Environmental release category (ERC): ERC8a, ERC8d (SpERC AISE and Cosmetics Europe (CE)).

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.

PROC4 Chemical production where opportunity for exposure arises.

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.

PROC10 Roller application or brushing. This includes application of paints, coatings, removers, adhesives or cleaning agents to surfaces with potential exposure arising from splashes.

PROC11 Non industrial spraying. Air dispersive techniques i.e. dispersion into air (= atomization) by e.g. pressurized air, hydraulic pressure or centrifugation, applicable for liquids and powders.

PROC13 Treatment of articles by dipping and pouring.

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).

ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor).

Further explanations:

Professional Use of Laundry products:

- CS1 Laundry detergent: Semi-automatic process (PROC1, PROC8a, PROC8b).
- CS2 Laundry detergent: Manual process (PROC8a, PROC8b, PROC10).
- CS3 Conditioner (softener/starch): Semi-automatic process (PROC1, PROC8a, PROC8b).
- CS4 Laundry aid (gasing): Semi-automatic process (PROC1, PROC8a, PROC8b).
- CS5 Laundry aid (non-gasing): Semi-automatic process (PROC1, PROC8a, PROC8b).

- CS6 Laundry aid (non-gasing): Manual process (PROC4, PROC8a, PROC8b).
- CS7 Prespotter/Stain remover: Manual process (PROC10, PROC11).

Professional Use of Dishwash products:
- CS8 Dishwash product: Manual process (PROC8a, PROC8b, PROC10).
- CS9 Rinse aid: Automatic process (PROC2, PROC8a, PROC8b).
- CS10 Dishwash product: Semi-automatic process (PROC1, PROC8a, PROC8b).
- CS11 Rinse aid: Semi-automatic process (PROC1, PROC8a, PROC8b).

Professional Use of General surface cleaning products:
- CS12 General purpose cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS13 General purpose cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS14 Kitchen cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS15 Kitchen cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS16 Sanitary cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS17 Sanitary cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS18 Descaling agent: Manual process (PROC10).
- CS19 Descaling agent: Spray and rinse manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS20 General surface cleaning: Dipping process: (PROC8a, PROC8b, PROC13).
- CS21 Oven/Grill cleaner: Manual process (PROC10).
- CS22 Oven/Grill Cleaner: Spray and wipe manual process (PROC10, PROC11).
- CS23 Glass cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS24 Glass cleaner: Spray and wipe manual process (PROC10, PROC11).
- CS25 Surface disinfectant: Manual process (PROC8a, PROC8b, PROC10).
- CS26 Surface disinfectant: Spray and rinse manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS27 Metal cleaning agent: Manual process (PROC10).
- CS28 Surface cleaning: Wet wipes manual process (PROC10).

Professional Use of Floor care products:
- CS29 Floor cleaner: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- CS30 Floor cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS31 Floor cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS32 Floor stripper: Manual process (PROC8a, PROC8b, PROC10).
- CS33 Floor stripper: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- CS34 Carpet cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS35 Carpet cleaner: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- CS36 Carpet cleaner: Prespotter, brush manual process (PROC10, PROC11).

Professional Use of Maintenance Products :
- CS37 Drain unblocker: Manual process (PROC13).
- CS38 Drain cleaner: Manual process (PROC13).

Professional Use of Vehicle cleaning Products:
- CS39 Car wash product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- CS40 Car wash product: Spray manual process (PROC8a, PROC8b, PROC11).
- CS41 Car wash product: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).
- CS42 Dewaxing product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- CS43 Boat cleaner: Manual process (PROC8a, PROC8b, PROC10).
- CS44 Boat cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).

Professional Use of Food beverage and pharmacos products:
- CS45 Animal housing care: Manual process (PROC8a, PROC8b, PROC10).

Professional Use of Facade/surface Cleaning Products:
- CS46 Facade/surface cleaner: High pressure process (PROC8a, PROC8b, PROC11).
- CS47 Facade/surface cleaner: Medium pressure process (PROC8a, PROC8b, PROC10, PROC11).

Professional Use of Medical Devices:
- CS48 Medical devices: Semi-automatic process (PROC1, PROC8a, PROC8b).
- CS49 Medical devices: Dipping process (PROC8a, PROC8b, PROC13).
- CS50 Medical devices: Manual process (PROC8a, PROC8b, PROC10).
- CS51 Medical devices: Spray and wipe manual process (PROC8a, PROC8b, PROC10, PROC11).

Professional Use of Polish products:
- CS1POLISH Floor polish, impregnation: Manual process (PROC10).
- CS2POLISH Floor polish, impregnation: Semi-Automatic process (PROC10).
- CS3POLISH Floor polish, impregnation: Spray and wipe manual process (PROC10, PROC11).
- CS4POLISH Wooden furniture care: Manual process (PROC10).
- CS5POLISH Wooden furniture care: Spray and wipe manual process (PROC10, PROC11).
- CS6POLISH Leather care product: Manual process (PROC10).
- CS7POLISH Leather care product: Spray and wipe manual process (PROC10, PROC11).

- CS8POLISH Leather care product: Semi-automatic process (PROC2, PROC8a, PROC8b).
- CS9POLISH Stainless steel care: Manual process (PROC10).
- CS10POLISH Stainless steel care: Spray and wipe manual process (PROC10, PROC11).

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

Product characteristics:	Concentration of substance: <1%. Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0.18%. Physical state: liquid (PROC1, PROC2, PROC4, PROC10, PROC11, PROC13); liquid and solid (PROC8a, PROC8b).
Amounts used:	Professionals may handle amounts of fragrance end-product in the kg-range per day.
Frequency and duration of use/exposure:	Duration: - PROC1, PROC2 (CS8POLISH), PROC4 (CS39, CS42), PROC10 (CS7, CS12-CS17, CS19, CS22-CS27, CS29-CS35, CS41, CS43-CS45, CS47, CS50, CS51, CS1POLISH-CS3POLISH, CS9POLISH), PROC11 (CS46): >4 hours. - PROC10 (CS2, CS8, CS18, CS28, CS36, CS4POLISH-CS7POLISH, CS10POLISH): 1-4 hours. - PROC8a/PROC8b (CS2, CS12-CS17, CS19, CS22-CS26, CS29-CS35, CS39-CS45, CS50, CS51, CS8POLISH), PROC10 (CS21), PROC11 (CS7, CS13, CS15, CS17, CS19, CS22, CS24, CS26, CS30, CS36, CS40, CS41, CS44, CS47, CS51, CS3POLISH): 15 minutes-1 hour. - PROC2 (CS9), PROC4 (CS6), PROC8a/PROC8b (CS1, CS3-CS6, CS8-CS11, CS20, CS46-49), PROC11 (CS5POLISH, CS7POLISH, CS10POLISH), PROC13: <15 minutes. Frequency: <=365 days/year.
Human factors not influenced by risk management:	ECETOC developed values for typically affected skin surface areas for each process category which vary from 240 to 1980 cm2.
Other given operational conditions affecting workers exposure:	Location: Unless otherwise stated, Indoor use. - PROC8a/PROC8b (CS41, CS43, CS44), PROC10 (CS41, CS43, CS44), PROC11 (CS41, CS44): Outdoor use. Domain: Professional use.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Unless otherwise stated, Basic general ventilation (1-3 air changes per hour): 0%. - PROC8a/PROC8b (CS41, CS43, CS44), PROC10 (CS41, CS43, CS44), PROC11 (CS41, CS44): Not relevant. Local exhaust ventilation: Not required.
Organisational measures to prevent/limit releases, dispersion and exposure:	Avoiding frequent and direct contact with substance. Minimisation of manual phases. Regular cleaning of equipment and work area. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: Unless otherwise stated, Not required. - PROC8a/8b (CS46, CS47), PROC10 (CS47), PROC11 (CS46, CS47): Yes (mimimum efficiency inhalation: 90%). Dermal protection: Unless otherwise stated, Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 80%). - PROC1, PROC2, PROC4, PROC10 (CS2, CS28, CS43, CS4POLISH, CS6POLISH): No (Effectiveness Dermal: 0%).
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:	Environmental release due to end-use of fragranced end-products is characterised by the IFRA guideline as wide dispersive use (IFRA 2012). It was assumed that indoor use of fragranced products is likely to generate emissions mainly into the waste water, i.e. the release to waste water was set to 100% and emissions into air or soil were neglected.
Product characteristics:	Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0,03%. Physical state: liquid.
Amounts used:	Daily wide dispersive use: 254,5 kg/day. Amounts used in the EU: 92892 kg/year. Fraction of regional tonnage used locally: 0.00075.
Frequency and duration of use:	Emission days: <=365 days/year. Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (freshwater); >=198,000 m3/day (seawater).
Other given operational conditions affecting environmental exposure:	Professional use. Indoor use. Release fraction to air from process: 0. Release fraction to wastewater from process: 1.0. Local release rate: 0,191 kg/day (IFRA 2012) Release fraction to soil from process (final release): 0.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC4, PROC10

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

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	2,743 mg/kg bw/day	0.392	PROC10
Worker, long-term, systemic	Inhalation	16,28 mg/m3	0,654	PROC4, PROC10
Worker, long-term, systemic	Combined routes	N/A	0,849	PROC10

Environment

Information for contributing scenario (2): ERC8a, ERC8d

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00107 mg/L	0,911	
Freshwater sediment	0,0192 mg/kg ww	0,911	
Marine water	0,000105 mg/L	0,896	
Marine water sediment	0,00186 mg/kg ww	0,881	
Soil	0,0162 mg/kg ww	0,983	
STP	0,00968 mg/L	0,00306	
Man via environment	0,00000578 mg/m3 / 0,000753 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral

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 (5): Consumer end-use of fragranced end products

1. Exposure scenario (5)

Short title of the exposure scenario:

Consumer end-use of fragranced end products

List of use descriptors:

Product category (PC): PC3, PC8, PC28, PC31, PC35, PC39
Environmental release category (ERC): ERC8a, ERC8d

Name of contributing environmental scenario and corresponding ERCs:

ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor).

Further explanations:

PC3 Air care products: Air fresheners aerosol (Mini-aerosol, timed release aerosol); Air fresheners non-aerosol (Perfume in/on solid substance (gel), diffusers (heated), candle).
PC8 Biocidal products (e.g. Disinfectants, pest control): Insecticides (liquid electric, spray neat); Repellents.
PC28 Perfumes, fragrances.
PC31 Polishes and wax blends: Furniture floor and leather care (spraying).
PC35 Washing and cleaning products: Laundry regular (powder, liquid); Laundry compact (powder, liquid/gel, tablet); Fabric conditioners (liquid regular, liquid concentrate); Laundry additives (powder bleach, liquid bleach, tablet); Hand dishwashing (liquid regular, liquid concentrate); Machine dishwashing (powder, liquid, tablet); Laundry aids (ironing aids-starch spray); Surface cleaners (liquid, powder, gel neat; spray neat); Toilet cleaners (powders, liquid, gel, tablet); Carpet cleaners (liquid, spray, solid); Wipes (bathroom, kitchen, floor); Oven cleaners (trigger spray).
PC39 Cosmetics, personal care products.

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

2. Conditions of use affecting exposure

2.1 Control of consumer exposure

General:	PC28 & PC39: 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 fragranced end-products: The weight fraction of an individual fragrance substance in fragranced products used by consumers is anticipated to be below 1% (IFRA 2012) except for air fresheners where pure fragrance compounds containing up to 5% of an individual substance may be put in a diffuser. Concentration of substance: Unless otherwise stated, covers concentrations up to 0,1%. - PC3 (Air fresheners aerosol): up to 0,25%. - PC3 (Air fresheners non-aerosol): up to 5%. - PC8 (Insecticides (liquid electric, spray neat); Repellents): up to 1%. - PC35 (Laundry regular, Laundry compact, Laundry additives, Hand dishwashing, Machine dishwashing): up to 0,05%. - PC35 (Toilet cleaners): up to 0,3%. - PC35 (Laundry aids): up to 0,025%.
Amounts used:	Consumers may use amounts of fragrance end-product in the gram-range per day.
Frequency and duration of use/exposure:	Frequency and duration of use: Consumers usually use fragranced end-products for a short duration, e.g. 20 minutes for a liquid all-purpose cleaner. The frequency of use depends on the product. While for example dishwashing products are used on a daily basis, all-purpose cleaners are generally used on 104 days per year, i.e. every third day (RIVM 2006).
Other given operational conditions affecting consumers exposure:	Body weight: 60 kg. Inhalation exposure model - The size of the room where the fragranced product is used depends on the application field of the fragranced product.
Conditions and measures related to personal protection and hygiene:	Consumers are not expected to use specific personal protection during the use of fragranced products.

2.2 Control of environmental exposure

General:	Environmental release due to end-use of fragranced end-products is characterised by the IFRA guideline as wide dispersive use (IFRA 2012). It was assumed that indoor use of fragranced products is likely to generate emissions mainly into the waste water, i.e. the release to waste water was set to 100% and emissions into air or soil were neglected.
Product characteristics:	Concentration of substance in fragranced end-products: Concentration of substance in fragranced end-products: It is anticipated that fragranced products normally will contain less than 1% of an individual fragrance substance (IFRA 2012). Multiplying the maximum concentration of the substance in fragrance compounds by the highest concentration of compounds in fragrance end-products of 6% gives a maximum concentration of Decanal in fragranced end-products is about 0.2%. Physical state: liquid.
Amounts used:	Daily wide dispersive use: 254,5 kg/day. Amounts used in the EU: 92892 kg/year. Fraction of the main local source: 0.00075.
Frequency and duration of use:	Emission days: <=365 days/year. Wide dispersive use.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (freshwater); >=198,000 m3/day (seawater).
Other given operational conditions affecting environmental exposure:	Consumer use. Release fraction to air from process: 0. Release fraction to wastewater from process: 1.0. Local release rate: 0,191 kg/day (IFRA 2012) Release fraction to soil from process (final release): 0.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PC3 (Air fresheners, aerosol), PC8 (Insecticides), PC8 (Repellents), PC35 (Hand dishwashing, Machine dishwashing).

Assessment method: AISE REACT Consumer Tool and ConsExpo Tool. Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Consumer, long-term, systemic	Dermal	0,923 mg/kg bw/day	0,264	PC8 (Repellents)
Consumer, long-term, systemic	Inhalation	0,0447 mg/m3	0,00733	PC8 (Insecticides), PC3 (Air fresheners, aerosol)
Consumer, long-term, systemic	Oral	0,000002 mg/kg bw/day	0,000000709	PC35 (Hand dishwashing, Machine dishwashing)
Consumer, long-term, systemic	Combined routes	N/A	0,264	PC8 (Repellents)

Environment

Information for contributing scenario (2): ERC8a, ERC8d

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00107 mg/L	0,911	
Freshwater sediment	0,0192 mg/kg ww	0,911	
Marine water	0.000105 mg/L	0,896	
Marine water sediment	0,00186 mg/kg ww	0,881	
Soil	0,0162 mg/kg ww	0,983	
STP	0,00968 mg/L	0,00306	

Compartment	PEC	RCR	Notes
Man via environment	0,00000578 mg/m3 / 0,000753 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral

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.