Safety Data Sheet
according to Regulation (EC) 1907/2006 (REACH)

Revision date: 2022-01-27
Supercedes date: 2021-02-09

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

1.1. Product identifier:

Product trade name:	Kalama* Lilestralis* Pure
Company product number:	LALPURE
REACH registration number:	01-2119907954-30-0000
Substance name:	2-(4-tert-Butylbenzyl)propionaldehyde
Substance identification number:	EC 201-289-8, EC Index number: 605-041-00-3
Other means of identification:	32229; p-tert-Butyl-alpha-methylhydrocinnamic aldehyde (BMHCA)

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

Uses:	Fragrance ingredient. Industrial applications. Professional applications. Consumer 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 Kalama Chemical Limited Dans Road Widnes, Cheshire WA8 0RF United Kingdom Telephone: +44 (0) 151 423 8000
EU Only Representative:	Penman Consulting bvba Avenue des Arts 10 B-1210 Brussels Belgium Telephone: +32 (0) 2 403 7239 email: pcbvba10@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).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

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

Acute Toxicity, Oral, category 4 , H302
Skin Irritation, category 2, H315
Skin sensitizer, category 1B, H317
Reproductive Toxicity, category 1B, H360
Hazardous to the aquatic environment, Chronic, category 3, H412

See Section 2.2 for full text of H (Hazard) statements (EC 1272/2008).

2.2. Label elements:

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

Hazard pictogram(s):

Signal word:
Danger

Hazard statements:
H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.

H360 May damage fertility. Suspected of damaging the unborn child.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements:
P201 Obtain special instructions before use.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P308+P313 IF exposed or concerned: Get medical advice/attention.
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.
Endocrine disrupting properties: No specific information available.
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
0000080-54-6	2-(4-tert-Butylbenzyl) propionaldehyde	99-100	Acute Tox. 4 Oral- Aquatic Chronic 3- Repr. 1B- Skin Irrit. 2- Skin Sens. 1B	H302-315-317-360-412
0056107-04-1	3-(p-tert-Butylphenyl)-2-methylpropanol	0.1-<1.0	Acute Tox. 4 Oral- Aquatic Chronic 3- Eye Irrit. 2- Repr. 2- Skin Sens. 1B	H302-317-319-361-412

CAS-No.	Chemical Name	REACH Registration No.	EC/List Number
0000080-54-6	2-(4-tert-Butylbenzyl) propionaldehyde	01-2119907954-30-0000	201-289-8
0056107-04-1	3-(p-tert-Butylphenyl)-2-methylpropanol	Impurity	259-996-2

CAS-No.	Chemical Name	M-factor	SCLs	ATE
0000080-54-6	2-(4-tert-Butylbenzyl) propionaldehyde	N/A	N/E	Oral ATE 1390 mg/kg
0056107-04-1	3-(p-tert-Butylphenyl)-2-methylpropanol	N/A	N/E	Oral ATE >300-<2000 mg/kg

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.

Following 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.

Following 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.

Following 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.

Following 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. Do not get in eyes, on skin or clothing. Do not breathe dust, vapor, aerosol, mist or gas. Do not ingest, taste, or swallow. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area.

7.2. Conditions for safe storage, including any incompatibilities:

Store cool and dry, under well-ventilated conditions. Keep away from heat, sparks and open flames. Store this material away

from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Do not reuse empty container without commercial cleaning or reconditioning. Empty container contains residual product which may exhibit hazards of product. Product can easily oxidize. It is recommended that opened containers be padded with nitrogen. Protect from light. 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-(4-tert-Butylbenzyl)propionaldehyde	N/E	N/E	N/E	N/E
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E	N/E	N/E	N/E

Chemical Name	UK WEL	Ireland OEL
2-(4-tert-Butylbenzyl)propionaldehyde	N/E	N/E
3-(p-tert-Butylphenyl)-2-methylpropanol	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):

2-(4-tert-Butylbenzyl)propionaldehyde

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	N/E	N/E	N/E	0,44 mg/m3
Workers	Dermal	0,41 mg/cm2	N/E	0,41 mg/cm2	1,79 mg/kg bw/day
General population	Inhalation	N/E	N/E	N/E	0,11 mg/m3
General population	Dermal	0,41 mg/cm2	N/E	0,41 mg/cm2	0,89 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	0,062 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

2-(4-tert-Butylbenzyl)propionaldehyde

Compartment	PNEC
Freshwater	0,004 mg/L
Freshwater sediment	0,528 mg/kg dw
Marine water	0,0004 mg/L
Marine water sediment	0,053 mg/kg dw
Intermittent releases	0,024 mg/L
Soil	0,103 mg/kg dw
STP	10 mg/L
Oral	No potential for bioaccumulation

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

8.2. Exposure controls:

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

Individual protection measures, such as personal protective equipment:

Eye/face protection: 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 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: Polyvinyl chloride (PVC), Viton. The protective gloves to be used must comply with the specifications of the Regulation (EU) 2016/425 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: 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:

Physical state:	Liquid
Colour:	Colorless
Odour:	Floral
Odour threshold:	Not Available
Melting point/Freezing point:	<-20°C (<-4°F)
Boiling point °C:	279 °C
Boiling point °F:	535 °F
Flammability:	Not flammable
Lower and upper explosion limit:	LEL: 0.5% UEL: 3.1%
Flash point:	>114 °C (>237 °F) Closed Cup
Auto-ignition temperature:	257°C (495°F)
Decomposition temperature:	>220°C (>428°F)
pH:	Not Available
Kinematic viscosity:	13.0 mm2/s (12.3 mPa.s) @ 20°C
Solubility in water:	33 mg/L (20°C)
Partition coefficient n-octanol/water (log value):	4.2 (24°C)
Vapour pressure:	0.0025 hPa @ 20°C
Density and/or relative density:	0.943-0.946 (20°C)
Relative vapour density:	> 1
Particle characteristics:	Not Applicable
% Volatile by weight:	100%
VOC:	100%

Amounts specified are typical and do not represent a specification.

9.2. Other information:

Information with regard to physical hazard classes:
Explosive properties: Not explosive
Oxidising properties: Not oxidizing

Other safety characteristics:
Evaporation rate: Not Available

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 contact with strong oxidizing agents.

10.6. Hazardous decomposition products:

Carbon dioxide, carbon monoxide and hydrocarbons.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity: Harmful if swallowed - Category 4.

Chemical Name	Inhalation LC50	Species	Oral LD50	Species	Dermal LD50	Species
2-(4-tert-Butylbenzyl)propionaldehyde	>0.18 mg/L (7 hours, no mortalities)	Rat/ adult	1390 mg/kg	Rat/ adult	>2000 mg/kg	Rat/ adult
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E	N/E	>300-<2000 mg/kg	Rat/ adult	N/E	N/E

Skin corrosion/irritation: Causes skin irritation - Category 2.

Chemical Name	Skin irritation	Species
2-(4-tert-Butylbenzyl)propionaldehyde	Irritant (OECD 404)	Rabbit/ adult
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E	N/E

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

Chemical Name	Eye irritation	Species
2-(4-tert-Butylbenzyl)propionaldehyde	Non-irritant	Rabbit/ adult
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E	N/E

Respiratory or skin sensitization: Skin sensitization - Category 1B.

Chemical Name	Skin sensitisation	Species
2-(4-tert-Butylbenzyl)propionaldehyde	Sensitizer	Weight of evidence
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E	N/E

Carcinogenicity: Not classified (no relevant information found).

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). 2-(4-TERT-BUTYLBENZYL)PROPIONALDEHYDE: Mutagenic assays were negative for both in vivo and in vitro assays.

Reproductive toxicity: May damage fertility or the unborn child - Category 1B. 2-(4-TERT-BUTYLBENZYL) PROPIONALDEHYDE: Repeated dose study, oral, male rats (1-generation study): NOAEL (No-observable-adverse- effect-level)(fertility) = 25 mg/kg/day (based on adverse effects on testes and fertility). Prenatal Developmental toxicity, oral, rat (OECD 414): NOAEL (developmental toxicity): 4.1 mg/kg bw/day; NOAEL (maternal toxicity) = 4.1 mg/kg/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-(4-TERT-BUTYLBENZYL)PROPIONALDEHYDE: Repeated dose, oral gavage, 90-day, rats (OECD 408): NOAEL (no-observed-adverse-exposure-level): 25 mg/kg/day (testicular atrophy and adverse clinical signs of toxicity), NOEL (no-exposure-effect-level): 5 mg/kg/day (plasma cholinesterase). Repeated dose, dermal, 5 days, rats: NOAEL: 1000 mg/kg bw/day (testicular atrophy and reduced body weight gain).

Aspiration hazard: Not classified.

Other toxicity information: No additional information available.

Information on likely routes of exposure:

General: Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure. 2-(4-TERT-BUTYLBENZYL)PROPIONALDEHYDE: May cause adverse reproductive effects based on animal data.

Eyes: May cause eye irritation.

Skin: May cause allergic skin reaction. Causes skin irritation.

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

Ingestion: Harmful if swallowed. Ingestion may cause irritation.

11.2. Information on other hazards

Endocrine disrupting properties: No specific information available.

Other information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

Chemical Name	Species	Acute	Acute	Chronic
2-(4-tert-Butylbenzyl)propionaldehyde	Fish	LC50 2.04 mg/L (96 hours)	N/E	NOEC >0.2 mg/L (21 days) (OECD 229)
2-(4-tert-Butylbenzyl)propionaldehyde	Invertebrates	EC50 10.7 mg/L (48 hours)	N/E	N/E
2-(4-tert-Butylbenzyl)propionaldehyde	Algae	EC50 29.155 mg/L (72 hours)	N/E	EC10 1.696 mg/L(72 hours)
2-(4-tert-Butylbenzyl)propionaldehyde	Micro-organisms	EC10 >100 mg/L (3 hours) (OECD 209)		
3-(p-tert-Butylphenyl)-2-methylpropanol	Fish	N/E	N/E	N/E
3-(p-tert-Butylphenyl)-2-methylpropanol	Invertebrates	N/E	N/E	N/E
3-(p-tert-Butylphenyl)-2-methylpropanol	Algae	N/E	N/E	N/E

12.2. Persistence and degradability:

Chemical Name	Biodegradation
2-(4-tert-Butylbenzyl)propionaldehyde	Readily biodegradable (OECD 301B)
3-(p-tert-Butylphenyl)-2-methylpropanol	Readily biodegradable (OECD 301B)

12.3. Bioaccumulative potential:

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
2-(4-tert-Butylbenzyl)propionaldehyde	274.3 L/kg (calculated)	4.2 (24°C)
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E	4.38 (calculated)

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
2-(4-tert-Butylbenzyl)propionaldehyde	1285 (calculated)
3-(p-tert-Butylphenyl)-2-methylpropanol	N/E

12.5. Results of PBT and vPvB assessment:

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

12.6. Endocrine disrupting properties:

No specific information available.

12.7. 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 or ID 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/ADN 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. Maritime transport in bulk according to IMO instruments

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. EU REACH is only relevant to substances either manufactured or imported into the EU. Emerald Kalama Chemical has met its obligations under the EU REACH regulation. EU REACH information regarding this product is provided for informational purposes only. Each Legal Entity may have differing EU REACH obligations, depending on their place in the supply chain. Emerald's compliance with EU REACH does not imply automatic coverage for Downstream Users located in the EU. For material manufactured outside of the EU, the importer of record must understand and meet their specific obligations under the regulation.

EU Authorizations and/or restrictions on use: This product contains a component listed on the Annex XIV Candidate List of Substances of Very High Concern (SVHC): 2-(4-tert-butylbenzyl)propionaldehyde.

Other EU information: No Additional Information

National regulations: No Additional Information

Chemical inventories:

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

UK REACH: As the UK has formally left the European Union, EU REACH [(EC) 1907/2006] is no longer directly applicable within the UK. Please see UK REACH formatted SDS for information related to UK REACH compliance.

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):

H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H360	May damage fertility or the unborn child.
H361	Suspected of damaging fertility or the unborn child.
H412	Harmful to aquatic life with long lasting effects.

Reason for revision: Changes in Section(s): 1, 2, 3, 11

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

Legend:
* : Trademark owned by Emerald Kalama Chemical, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
ATE: Acute toxicity estimate
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
SCL: Specific concentration limit
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 Kalama Chemical, LLC
1499 SE Tech Center Place, Suite 300
Vancouver, WA 98683
United States

Annex

Exposure Scenarios

Substance information:

Name of substance: 2-(4-tert-Butylbenzyl)propionaldehyde.
EC# 201-289-8 / CAS# 80-54-6
REACH Registration number: 01-2119907954-30-0000.

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: Consumer use - Industrial, Professional and Consumer end-use of washing and cleaning products
ES5: Consumer use - Consumer and professional end-use of polishes and wax blends
ES6: Consumer use - Consumer end-use of air care products
ES7: Consumer use - Consumer end-use of biocides
ES8: Consumer use - Professional and consumer end-use of cosmetics
ES9: Service life (consumers) - Use of substance in scented articles

General remarks:

The first tier environmental exposure assessments have at first instance been performed using EUSES v2.1 which is part of Chemical Safety Assessment and Reporting tool version 2.3 (CHESAR v2.3). 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 2.3 (CHESAR v2.3).

The TRA Consumers 3.0 tool has been used to estimate consumer exposures unless otherwise indicated. 2-(4-tert-butylbenzyl)-propionaldehyde is present at low levels as a fragrance substance in fragrances found in consumer products including household care and maintenance and air freshener products and scented articles such as candles. 2-(4-tert-butylbenzyl)-propionaldehyde is incorporated at <5% in fragrance mixtures (pre-formulations), which are then sold and incorporated into final consumer products at low levels (nominally 0.1% and lower).

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
Process category (PROC): PROC1, PROC2, PROC8b
Environmental release category (ERC): ERC6a (SpERC IFRA 2.1a.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.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.

Name of contributing environmental scenario and corresponding ERCs:
ERC6a Use of intermediate.

Further explanations:
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. Wear chemical resistant gloves in combination with basic employee training. Chemical safety goggles recommended.

Product characteristics:
Concentration of substance: Up to 100%.
Physical state: liquid.

Frequency and duration of use/exposure:
Duration:

- PROC1: <=8 hours/day.
- PROC2: <=4 hours/day.
- PROC8b: <=1 hour/day.

Human factors not influenced by risk management:
Exposed skin surface:
- PROC1: 240 cm2 (one hand, face side only).
- PROC2, PROC8b: 480 cm2 (two hands, face side only).

Other given operational conditions affecting workers exposure:
Location:
- PROC2, PROC8b: Indoor use.
- PROC1: 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:
- PROC1: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC2, PROC8b: 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.
- PROC8b: Semi-closed process with occasional controlled exposure.
Local exhaust ventilation:
- PROC1: Not required.
- PROC2, PROC8b: Yes (95% effectiveness).
Local exhaust ventilation (for dermal):
- PROC1: Not required.
- PROC2, PROC8b: 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.
Chemical safety goggles recommended.
Dermal protection:
- PROC1: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (minimum efficiency dermal: 90%).
- PROC2, PROC8b: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (minimum efficiency dermal: 95%)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:
Use Local Exhaust ventilation.
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:
Concentration of substance: Up to 100%.
Physical state: liquid.

Amounts used:
Maximum daily use at a site: 1.25 ton/day.
Maximum annual use at a site: 125 tons/year.
Percentage of tonnage used at regional scale: 100 %.

Frequency and duration of use:
Emission days: <=100 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: 0.312 kg/day (SpERC IFRA 2.1a.v1).
Release fraction to wastewater from process (initial release): 0.00002; (final release): 0.000002. Local release rate: 0.002 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 - Not applied (Effectiveness Water: 0%).
On-site biological treatment: Not applied (Effectiveness Water: 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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Onsite pre-treatment of waste water: Prevention of release to external waste water (Based on emissions values of a STP in EUSES 11.4% would be released to waste water) (Effectiveness Water: 90%).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Health: CHESAR v2.3 Worker TRA v3. Only highest figures are presented here.

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,034 mg/kg bw/day	0,301	PROC8b
Worker, long-term, systemic, Inhalation	0,128 mg/m3	0,635	PROC8b
Worker, long-term, systemic, Combined routes	N/A	0,936	PROC8b
Worker, long-term, local, Dermal	0,002 mg/cm2	<0,01	PROC8b

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006783 mg/L	0.332	
Marine water	0.00006113 mg/L	0.255	
Soil	0.0004222 mg/kg dw	<0.01	
STP	0.0001423 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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: <=8 hours/day. PROC2: <=4 hours/day. PROC8b: <=1 hour/day. Dermal protection: PROC1: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (minimum efficiency dermal: 90%). PROC2, PROC8b: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (minimum efficiency 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, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC15
Environmental release category (ERC): ERC2 (SpERC IFRA 2.1a.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.
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.

Further explanations:
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. Wear chemical resistant gloves in combination with basic employee training. Chemical safety goggles recommended.

Product characteristics:
Concentration of substance:
- PROC3, PROC5, PROC8b, PROC9, PROC15: 5-25%.
- PROC1, PROC2: Up to 100%.
Physical state: liquid.

Frequency and duration of use/exposure:
Duration:
- PROC1: <=8 hours/day.
- PROC3: <=4 hours/day.
- PROC5, PROC8b, PROC9: <=1 hour/day.
- PROC2, PROC15: <=15 minutes.

Human factors not influenced by risk management:
Exposed skin surface:
- PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only).
- PROC2, PROC5, PROC8b, PROC9: 480 cm2 (two hands, face side only).

Other given operational conditions affecting workers exposure:
Location:
- PROC2, PROC3, PROC5, PROC8b, PROC9, PROC15: Indoor use.
- PROC1: 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:
- PROC1: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC2, PROC3, PROC5, PROC8b, PROC9, PROC15: 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, PROC9: Semi-closed process with occasional controlled exposure.
- PROC5, PROC15: No.
Local exhaust ventilation:
- PROC1: Not required.
- PROC15: Yes (90% effectiveness).
- PROC2, PROC3, PROC5, PROC8b, PROC9: Yes (95% effectiveness).
Local exhaust ventilation (for dermal):
- PROC1, PROC15: Not required.
- PROC2, PROC3, PROC5, PROC8b, PROC9: 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.
Chemical safety goggles recommended.
Dermal protection:
- PROC1, PROC15: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (minimum efficiency dermal: 90%).
- PROC2, PROC3, PROC5, PROC8b, PROC9: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (minimum efficiency dermal: 95%)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:
Use Local Exhaust ventilation.
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.

Amounts used:
Maximum daily use at a site: 0.038 ton/day.
Maximum annual use at a site: 3.75 tons/year.
Percentage of tonnage used at regional scale: 10 %.

Frequency and duration of use:
Emission days: <=100 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: 0.009 kg/day (SpERC IFRA 2.1a.v1).
Release fraction to wastewater from process (initial release): 0.00002; (final release): 0.000006. Local release rate: 0.000225 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%).
On-site biological treatment: Not applied (Effectiveness Water: 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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Health: CHESAR v2.3 Worker TRA v3. Only highest figures are presented here.

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,041 mg/kg bw/day	0,289	PROC5
Worker, long-term, systemic, Inhalation	0,276 mg/m3	0,549	PROC3
Worker, long-term, systemic, Combined routes	N/A	0,594	PROC5
Worker, long-term, local, Dermal	0,006 mg/cm2	0,012	PROC15

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006654 mg/L	0.326	
Marine water	0.00005984 mg/L	0.249	
Soil	0.0000638 mg/kg dw	<0.01	
STP	0.0000128 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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: <=8 hours/day. PROC3: <=4 hours/day. PROC5, PROC8b, PROC9: <=1 hour/day. PROC2, PROC15: <=15 minutes. Dermal protection: PROC1, PROC15: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (minimum efficiency dermal: 90%). PROC2, PROC3, PROC5, PROC8b, PROC9: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (minimum efficiency dermal: 95%)Concentration of substance: PROC3, PROC5, PROC8b, PROC9, PROC15: 5-25%. PROC1, PROC2: 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 (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:
Product category (PC): PC3, PC8, PC28, PC31, PC35, PC39
Process category (PROC): PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14, PROC15
Environmental release category (ERC): ERC2 (SpERC IFRA 2.1a.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.
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 in laboratories (less than or equal to 1 l or 1 kg present at workplace).

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

Further explanations:
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. Wear chemical resistant gloves in combination with basic employee training. Chemical safety goggles recommended.

Product characteristics:
Concentration of substance:
- PROC1, PROC2: 5-25%.
- PROC3, PROC5, PROC8b, PROC9, PROC14, PROC15: <1%.
Physical state: liquid.

Frequency and duration of use/exposure:
Duration:
- PROC1, PROC3, PROC5: <=8 hours/day.
- PROC14: <=4 hours/day.
- PROC8b, PROC9: <=1 hour/day.
- PROC2, PROC15: <=15 minutes.

Human factors not influenced by risk management:
Exposed skin surface:
- PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only).
- PROC2, PROC5, PROC8b, PROC9, PROC14: 480 cm2 (two hands, face side only).

Other given operational conditions affecting workers exposure:
Location:
- PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14, PROC15: Indoor use.
- PROC1: 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:
- PROC1: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14, PROC15: 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, PROC9: Semi-closed process with occasional controlled exposure.
- PROC5, PROC14, PROC15: No.
Local exhaust ventilation:
- PROC1, PROC15: Not required.
- PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14: Yes (95% effectiveness).
Local exhaust ventilation (for dermal):
- PROC1, PROC2, PROC3, PROC8b, PROC9, PROC14, PROC15: Not required.
- PROC5: 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.
Chemical safety goggles recommended.
Dermal protection:
- PROC1, PROC15: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (minimum efficiency dermal: 90%).
- PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (minimum efficiency dermal: 95%)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:
Use Local Exhaust ventilation.
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.

Amounts used:
Maximum daily use at a site: 0.1 ton/day.
Maximum annual use at a site: 30 tons/year.
Percentage of tonnage used at regional scale: 10 %.

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: 0.025 kg/day (SpERC IFRA 2.1a.v1).
Release fraction to wastewater from process (initial release): 0.00002; (final release): 0.00002. Local release rate: 0.002 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 - Not applied (Effectiveness Water: 0%).
On-site biological treatment: Not applied (Effectiveness Water: 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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Health: CHESAR v2.3 Worker TRA v3. Only highest figures are presented here.

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,034 mg/kg bw/day	0,603	PROC8b, PROC9
Worker, long-term, systemic, Inhalation	0,128 mg/m3	0,635	PROC5, PROC15
Worker, long-term, systemic, Combined routes	N/A	0,695	PROC15
Worker, long-term, local, Dermal	0,006 mg/cm2	0,015	PROC2

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006755 mg/L	0.331	
Marine water	0.00006085 mg/L	0.254	
Soil	0.0003408 mg/kg dw	<0.01	
STP	0.0001138 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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, PROC3, PROC5: <=8 hours/day. PROC14: <=4 hours/day. PROC8b, PROC9: <=1 hour/day. PROC2, PROC15: <=15 minutes. Dermal protection: PROC1, PROC15: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (minimum efficiency dermal: 90%). PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (minimum efficiency dermal: 95%)Concentration of substance: PROC1, PROC2: 5-25%. PROC3, PROC5, PROC8b, PROC9, PROC14, PROC15: <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): Consumer use - Industrial, Professional and Consumer end-use of washing and cleaning products

1. Exposure scenario (4)

Short title of the exposure scenario:
Consumer use - Industrial, Professional and Consumer end-use of washing and cleaning products

List of use descriptors:
Product category (PC): PC35
Environmental release category (ERC): ERC8a (SpERC AISE 8a.1a.v2)

Further explanations:
Consumer application.
Industrial application.
Professional application.
Generic exposure scenario: IFRA GES 3 (IU3); GES 4 (IU4); GES 6 (IU6).
PC35 - Laundry and dish washing products: AISE P102, P103, P105, P108, P111, P112, P113, P201, P202, P203, P204, P301, P302, P303, P304, P305, P306, P307, P308, P309, P310, P311, P312, P313, P314, P315, P316, P317, P401, P402, P403, P404, P405, P409, P410, P411, P606, P607, P701, P702, P703, P704, P705, P706, P808, P901, P902, P1101, P1102, P1103, P1104, C1, C2, C3, C4, C5, C6, C7, C8, C10, C11, C12, C15, C21, C22.

PC35 - Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners): AISE P102, P103, P105, P108, P111, P112, P113, P201, P202, P203, P204, P301, P302, P303, P304, P305, P306, P307, P308, P309, P310, P311, P312, P313, P314, P315, P316, P317, P401, P402, P403, P404, P405, P409, P410, P411, P606, P607, P701, P702, P703, P704, P705, P706, P808, P901, P902, P1101, P1102, P1103, P1104, C1, C2, C3, C4, C5, C6, C7, C8, C10, C11, C12, C15, C21, C22.

PC35 - Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners): AISE P102, P103, P105, P108, P111, P112, P113, P201, P202, P203, P204, P301, P302, P303, P304, P305, P306, P307, P308, P309, P310, P311, P312, P313, P314, P315, P316, P317, P401, P402, P403, P404, P405, P409, P410, P411, P606, P607, P701, P702, P703, P704, P705, P706, P808, P901, P902, P1101, P1102, P1103, P1104, C1, C2, C3, C4, C5, C6, C7, C8, C10, C11, C12, C15, C21, C22.

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

2. Conditions of use affecting exposure

2.1 Control of consumer exposure

General:
An exposure assessment of substances classified as hazardous is not required if the concentration of the substance in the mixture (i.e. professional formulations or consumer end-products) is lower than the REACH regulatory limit as listed in REACH Article 14.2. Concentration of this substance in products for this application/use is typically significantly less than 0.1%.

Product characteristics:
Concentration of substance in mixture: Up to 0.0005 g/g.
Oral contact foreseen: No.

Amounts used:
Applied amounts for each use event:
- Laundry and dish washing products: 150 g.
- Cleaners, liquids: 60 g.
- Cleaners, trigger sprays: 30 g.

Frequency and duration of use/exposure:
Duration covers exposure up to:
- Laundry and dish washing products: 1 hour/event.
- Cleaners, liquids: 0.33 hour/event.
- Cleaners, trigger sprays: 20 minutes/event.

Frequency - covers use frequency: up to 1 time/day.

Human factors not influenced by risk management:
Exposed skin surface:
- Laundry and dish washing products: Hands.
- Cleaners, liquids; Cleaners, trigger sprays: Inside hand/one hand/palm of hand.

Dermal transfer factor=0.01.

2.2 Control of environmental exposure

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

Amounts used:
Daily wide dispersive use: 0.0000586 tons/day.
Percentage of tonnage used at regional scale: 10 %.

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 (default).

Other given operational conditions affecting environmental exposure:
Industrial use.
Indoor/Outdoor use.
Professional use.
Consumer use.
Release fraction to air from process (initial release): 0.0; (final release): 0.0 (SpERC AISE 8a.1a.v2).

Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.059 kg/day (SpERC AISE 8a.1a.v2).
Release fraction to soil from process (final release): 0.0 (SpERC AISE 8a.1a.v2).
Chemical waste - continuous generation: Spent fluid discharged to wastewater.
Type of process: Substance applied in aqueous process solution with negligible volatilization.

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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Health: CHESAR V2.3 Consumer TRA v3. Only highest figures are presented here.

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,0007146 mg/kg bw/day	0,021	Laundry and dish washing products
Consumer, long-term, systemic, Inhalation	0,023 mg/m3	0,395	Laundry and dish washing products
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	Laundry and dish washing products
Consumer, long-term, systemic, Combined routes	N/A	0,416	Laundry and dish washing products
Consumer, long-term, local, Inhalation	0,023 mg/m3	0,395	Laundry and dish washing products

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.000997 mg/L	0.489	
Marine water	0.000093 mg/L	0.388	
Soil	0.009 mg/kg dw	0.197	
STP	0.003 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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

Health

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

Environment

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

Exposure scenario (5): Consumer use - Consumer and professional end-use of polishes and wax blends

1. Exposure scenario (5)

Short title of the exposure scenario:
Consumer use - Consumer and professional end-use of polishes and wax blends

List of use descriptors:
Product category (PC): PC31
Environmental release category (ERC): ERC8a (SpERC AISE 8a.1a.v2)

Name of contributing environmental scenario and corresponding ERCs:
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).

Further explanations:
Consumer application.
Professional application.
Generic exposure scenario: IFRA GES 5 (IU5); GES 9 (IU9).
PC31: Polishes and wax blends: Polishes, wax/cream; Polishes, spray (furniture, shoes).

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:
An exposure assessment of substances classified as hazardous is not required if the concentration of the substance in the mixture (i.e. professional formulations or consumer end-products) is lower than the REACH regulatory limit as listed in REACH Article 14.2. Concentration of

this substance in products for this application/use is typically significantly less than 0.1%.

Product characteristics:
Concentration of substance in mixture: Up to 0.001 g/g.
Oral contact foreseen: No.

Amounts used:
Applied amounts for each use event: 30 g.

Frequency and duration of use/exposure:
Duration covers exposure up to:
- Polishes, wax/cream: 4 hours/event.
- Polishes, spray: 0.33 hour/event.
Frequency - covers use frequency: up to 1 time/day.

Human factors not influenced by risk management:
Exposed skin surface: Inside hand/one hand/palm of hand.
Dermal transfer factor=0.01.

2.2 Control of environmental exposure

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

Amounts used:
Daily wide dispersive use: 0.0000021 tons/day.
Percentage of tonnage used at regional scale: 10 %.

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 (default).

Other given operational conditions affecting environmental exposure:
Indoor/Outdoor use.
Professional use.
Consumer use.
Release fraction to air from process (initial release): 0.0; (final release): 0.0 (SpERC AISE 8a.1a.v2).
Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.002 kg/day (SpERC AISE 8a.1a.v2).
Release fraction to soil from process (final release): 0.0 (SpERC AISE 8a.1a.v2).
Chemical waste - continuous generation: Spent fluid discharged to wastewater.
Type of process: Substance applied in aqueous process solution with negligible volatilization.

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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Health: CHESAR V2.3 Consumer TRA v3. Only highest figures are presented here.

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,0007147 mg/kg bw/day	0,021	
Consumer, long-term, systemic, Inhalation	0,441 mg/m3	0,620	Polishes, spray
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Combined routes	N/A	0,630	Polishes, spray
Consumer, long-term, local, Inhalation	0,441 mg/m3	0,620	Polishes, spray

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006761 mg/L	0.331	
Marine water	0.00006091 mg/L	0.254	
Soil	0.0003552 mg/kg dw	<0.01	
STP	0.0001195 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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 (6): Consumer use - Consumer end-use of air care products

1. Exposure scenario (6)

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 (SpERC AISE 8a.1b.v2)

Name of contributing environmental scenario and corresponding ERCs:

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

Further explanations:

PC3 Air care products: Air care, instant action (aerosol sprays); Air care continuous action (solid and liquid).
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). For further information on CEFIC (The European Chemical Industry Council) Specific Environmental Release Categories (SpERCs), see http://www.cefic.org/Industry-support/Implementing-reach/Libraries/.

2. Conditions of use affecting exposure

2.1 Control of consumer exposure

General:

An exposure assessment of substances classified as hazardous is not required if the concentration of the substance in the mixture (i.e. professional formulations or consumer end-products) is lower than the REACH regulatory limit as listed in REACH Article 14.2. Concentration of this substance in products for this application/use is typically significantly less than 0.1%.

Product characteristics:

Concentration of substance in mixture: Up to 0.002 g/g.
Oral contact foreseen: No.

Amounts used:

Applied amounts for each use event:
- Air care, instant action (aerosol sprays): 1.4 g.
- Air care continuous action (solid and liquid): 0.000029 g.

Frequency and duration of use/exposure:

Duration covers exposure up to:
- Air care, instant action (aerosol sprays): 0.01 hour/event.
- Air care continuous action (solid and liquid): 8 hours/event.

Frequency - covers use frequency:
- Air care, instant action (aerosol sprays): up to 4 times/day.
- Air care continuous action (solid and liquid): up to 1 time/day.

Human factors not influenced by risk management:

Exposed skin surface:
- Air care, instant action (aerosol sprays): dermal exposure negligible compared to inhalation.
- Air care continuous action (solid and liquid): fingertips.

Dermal transfer factor=0.01.

2.2 Control of environmental exposure

General:

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

Amounts used:

Daily wide dispersive use: 0.0000021 tons/day.
Percentage of tonnage used at regional scale: 10 %.

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 (default).

Other given operational conditions affecting environmental exposure:

Indoor/Outdoor use.
Consumer use.
Release fraction to air from process (initial release): 0.0; (final release): 0.0 (SpERC AISE 8a.1b.v2).
Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.002 kg/day (SpERC AISE 8a.1b.v2).
Release fraction to soil from process (final release): 0.0 (SpERC AISE 8a.1b.v2).
Type of process: Spraying of involatile solids, which finally are disposed off via wastewater.

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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Health: CHESAR V2.3 Consumer TRA v3. Only highest figures are presented here.

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,00001488 mg/kg bw/day	<0,01	Air care, continuous action (solid and liquid)
Consumer, long-term, systemic, Inhalation	0,609 mg/m3	0,410	Air care, instant action (aerosol sprays)
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Combined routes	N/A	0,420	Air care, instant action (aerosol sprays)
Consumer, long-term, local, Inhalation	0,609 mg/m3	0,410	Air care, instant action (aerosol sprays)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006761 mg/L	0.331	
Marine water	0.00006091 mg/L	0.254	
Soil	0.0003552 mg/kg dw	<0.01	
STP	0.0001195 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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 biocides

1. Exposure scenario (7)

Short title of the exposure scenario:
Consumer use - Consumer end-use of biocides

List of use descriptors:
Product category (PC): PC8
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:
Consumer application.
Generic exposure scenario: IFRA GES 8 (IU8).
PC8 Biocidal products: AISE C19 Insecticides and repellents.

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:
An exposure assessment of substances classified as hazardous is not required if the concentration of the substance in the mixture (i.e. professional formulations or consumer end-products) is lower than the REACH regulatory limit as listed in REACH Article 14.2. Concentration of this substance in products for this application/use is typically significantly less than 0.1%.

2.2 Control of environmental exposure

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

Amounts used:
Daily wide dispersive use: 0.0000021 tons/day.

Percentage of tonnage used at regional scale: 10 %.

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 (default).

Other given operational conditions affecting environmental exposure:
Consumer 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: 0.002 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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006761 mg/L	0.331	
Marine water	0.00006091 mg/L	0.254	
Soil	0.0003552 mg/kg dw	<0.01	
STP	0.0001195 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

Exposure scenario (8): Consumer use - Professional and consumer end-use of cosmetics

1. Exposure scenario (8)

Short title of the exposure scenario:
Consumer use - Professional and consumer end-use of cosmetics

List of use descriptors:
Product category (PC): PC28, PC39
Environmental release category (ERC): ERC8a (SpERC Cosmetics Europe 8a.1a.v2)

Name of contributing environmental scenario and corresponding ERCs:
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).

Further explanations:
Consumer application.
Professional application.
Generic exposure scenario: IFRA GES 10 (IU10).
PC28: Perfumes, fragrances.
PC39: Cosmetics, personal care products.

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

2. Conditions of use affecting exposure

2.1 Control of 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

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

Amounts used:
Daily wide dispersive use: 0.0000027 tons/day.
Percentage of tonnage used at regional scale: 10 %.

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 (default).

Other given operational conditions affecting environmental exposure:
Professional use.
Indoor use.
Consumer use.
Release fraction to air from process (initial release): 0.0; (final release): 0.0 (SpERC Cosmetics Europe 8a.1a.v2).
Release fraction to wastewater from process (initial release): 1.00; (final release): 1.00. Local release rate: 0.003 kg/day (SpERC Cosmetics Europe 8a.1a.v2).
Release fraction to soil from process (final release): 0.0 (SpERC Cosmetics Europe 8a.1a.v2).
Type of process: Substance applied in aqueous process solution with negligible volatilization.

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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006795 mg/L	0.333	
Marine water	0.00006125 mg/L	0.255	
Soil	0.0004485 mg/kg dw	<0.01	
STP	0.0001536 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

Exposure scenario (9): Service life (consumers) - Use of substance in scented articles

1. Exposure scenario (9)

Short title of the exposure scenario:
Service life (consumers) - Use of substance in scented articles

List of use descriptors:
Environmental release category (ERC): ERC11a
Article category (AC): AC0

Name of contributing environmental scenario and corresponding ERCs:
ERC11a Widespread use of articles with low release (indoor).

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:
Fragranced end-products are available to consumers in the general public and in private households. A special case is the incorporation of fragrance compounds into fragranced articles. In the sense of REACH, the fragrance is a substance intended to be released from the article. However, articles containing fragrances are not considered since the concentrations of fragrance substances in these articles are below the REACH regulatory limit of 0.1%.

2.2 Control of environmental exposure

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

Amounts used:
Daily wide dispersive use: 0.0000027 tons/day.
Percentage of tonnage used at regional scale: 10 %.

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 (default).

Other given operational conditions affecting environmental exposure:
Consumer use.
Release fraction to air from process (initial release): 0.0005; (final release): 0.0005.
Release fraction to wastewater from process (initial release): 0.0005; (final release): 0.0005. Local release rate: 0.00000135 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=88.62%).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:
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

Assessment method-Environment: CHESAR v2.3 - EUSES v2,1.

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0006642 mg/L	0.326	
Marine water	0.00005972 mg/L	0.249	
Soil	0.00002889 mg/kg dw	<0.01	
STP	0.00000007682 mg/L	<0.01	

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

Notes: Direct and indirect exposure of the sediment compartment is unlikely and the substance is readily biodegradable.

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.