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

Revision date: 1/20/2022
Supercedes: 10/19/2021

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

1.1. Product identifier:

Product trade name:	Kalama* Hexyl Cinnamic Aldehyde
Company product number:	HCA
UK REACH registration number:	DUIN Submitted
Substance name:	(E)-2-benzylideneoctanal
Substance identification number:	EC 639-566-4
Other means of identification:	AHCA; HCA, α-n Hexyl Cinnamic Aldehyde; α-Hexylcinnamaldehyde; α-n-Hexyl-β-Phenylacrolein; Octanal, 2-(phenylmethylene)

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

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

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

Manufacturer/Supplier:	Emerald Kalama Chemical, LLC 1296 NW Third Street Kalama, WA 98625 United States Telephone: +1-360-673-2550 1499 SE Tech Center Place, Suite 300 Vancouver, WA 98683 United States Telephone: +1-360-954-7100
UK Only Representative:	Penman Consulting Ltd Medina House, 2 Station Avenue Bridlington, East Yorkshire England Y016 4LZ Telephone: +44 1367 718 474 email: pcltd09@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 GB CLP as amended:

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

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

2.2. Label elements:

Product labeling according to GB CLP as amended:

Hazard pictogram(s):

Signal word:
Warning

Hazard statements:
H317 May cause an allergic skin reaction.
H400 Very toxic to aquatic life.

H411 Toxic to aquatic life with long lasting effects.

Precautionary statements:

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

Supplemental information: No Additional Information

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

2.3. Other hazards:

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

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

3.1. Substance:

CAS-No.	Chemical Name	Weight%	Classification	H Statements
000101-86-0	α-Hexylcinnamaldehyde	97-100	Aquatic Acute 1- Aquatic Chronic 2- Skin Sens. 1	H317-400-411
0000128-37-0	2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	0.1-<0.3	Aquatic Acute 1- Aquatic Chronic 1- STOT SE 3 RTI	H335-400-410

CAS-No.	Chemical Name	Weight%	UK REACH Registration No.	EC/List Number
000101-86-0	α-Hexylcinnamaldehyde	97-100	DUIN Submitted	202-983-3 (639-566-4)
0000128-37-0	2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	0.1-<0.3	Not Available	204-881-4

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

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

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

SECTION 4: First aid measures

4.1. Description of first aid measures:

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

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

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

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

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

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

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

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

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media:

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

Unsuitable: 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.

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

5.3. Advice for firefighters:

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

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

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

6.2. Environmental precautions:

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

6.3. Methods and material for containment and cleaning up:

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

6.4. References to other sections:

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

SECTION 7: Handling and storage

7.1. Precautions for safe handling:

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

7.2. Conditions for safe storage, including any incompatibilities:

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

7.3. Specific end use(s):

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

SECTION 8: Exposure controls / personal protection

8.1. Control parameters:

Occupational exposure limits (OEL):

Chemical Name	ACGIH - TWA/Ceiling	ACGIH - STEL
α-Hexylcinnamaldehyde	N/E	N/E
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	2 mg/m3 TWA (inhalable fraction and vapor)	N/E

Chemical Name	UK WEL

Chemical Name	UK WEL
α-Hexylcinnamaldehyde	N/E
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	10 mg/m3 TWA, 30 mg/m3 STEL

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

Derived No Effect Levels (DNELs):

α-Hexylcinnamaldehyde

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	6,28 mg/m3	N/E	N/E	0,078 mg/m3 (0,01 mg/kg bw/day)
Workers	Dermal	525 µg/cm2	N/E	525 µg/cm2/day (6,43 mg/kg bw/day)	18,2 mg/kg bw/day
General population	Inhalation	4,71 mg/m3	N/E	N/E	0,019 mg/m3 (0,0063 mg/kg bw/day)
General population	Dermal	78,7 µg/cm2	N/E	78,7 µg/cm2/day	9,11 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	0,056 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

α-Hexylcinnamaldehyde

Compartment	PNEC
Freshwater	0,00126 mg/L
Freshwater sediment	3,2 mg/kg dw
Marine water	0,000126 mg/L
Marine water sediment	0,064 mg/kg dw
Intermittent releases	0,0247 mg/L
Soil	0,398 mg/kg dw
STP	10 mg/L
Oral	6,6 mg/kg food

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

8.2. Exposure controls:

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

Individual protection measures, such as personal protective equipment:

Eye/face protection: Wear eye protection.

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

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

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

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

Environmental exposure controls: See Sections 6 and 12.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Appearance:	Liquid. Pale yellow
Odour:	Jasmine
Odour threshold:	Not Available
pH:	Not Available
Melting point/Freezing point:	4 °C (39 °F)
Initial boiling point and boiling range °C:	305-311 °C
Initial boiling point and boiling range °F:	581-591 °F
Flash point:	>100 °C (>212 °F) Tag Closed Cup
Evaporation rate:	< 0.01
Flammability (solid, gas):	Not Applicable (liquid)
Upper/lower flammability or explosive limits:	LFL/LEL: Not Available

	UFL/UEL: Not Available
Vapour pressure:	<0.02 mm Hg (20 °C)
Vapour density:	Not Available
Relative density:	0.95-0.96 (25 °C)
Solubility in water:	1.62 mg/L @ 20°C
Partition coefficient (n-octanol/water):	5.3 (24°C)
Autoignition temperature:	236 °C (456 °F)
Decomposition temperature:	Not Available
Viscosity:	Not Available
Explosive properties:	Not explosive
Oxidising properties:	Not oxidizing
% Volatile By weight:	100%
VOC:	100%

9.2. Other information:

Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

10.1. Reactivity:

None known.

10.2. Chemical stability:

This product is stable.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will not occur.

10.4. Conditions to avoid:

Excessive heat and ignition sources.

10.5. Incompatible materials:

Avoid contact with strong oxidizing agents.

10.6. Hazardous decomposition products:

Carbon dioxide and carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects:

Information on likely routes of exposure:

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

Eyes: May cause eye irritation.

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

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

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

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

Chemical Name	Inhalation LC50	Species	Oral LD50	Species	Dermal LD50	Species
α-Hexylcinnamaldehyde	>2.12 mg/L (aerosol, measured, 4 hours)	Rat/ adult	3100 mg/kg	Rat/ adult male	>3000 mg/kg	Rabbit/ adult
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	N/E	N/E	>2930 mg/kg	Rat/ adult	>2000 mg/kg	Rabbit/ adult

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

Chemical Name	Skin irritation	Species
α-Hexylcinnamaldehyde	Mild-moderate irritant	Rabbit/ adult
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Mild irritant	Rabbit/ adult

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

Chemical Name	Eye irritation	Species
α-Hexylcinnamaldehyde	Slight irritant	Rabbit/ adult
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Mild irritant	Rabbit/ adult

Respiratory or skin sensitization: Skin sensitization - Category 1.

Chemical Name	Skin sensitisation	Species
α-Hexylcinnamaldehyde	Sensitizer	Mouse/Local lymph node assay
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Non-sensitizer	Human

Carcinogenicity: Not classified (no relevant information found).

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

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). BHT (Butylated Hydroxytoluene):The NOAEL (no-observed-adverse-effect-level) for reproductive toxicity was 25 mg/kg/day based on lower numbers of litters of ten or more pups. From studies with mice and rats, there is no evidence of teratogenic effects - the NOEL (no-observed-effect-level) for developmental toxicity was 800 mg/kg/day. ALPHA-HEXYLCINNAMALDEHYDE: Reproductive and Developmental toxicity screening test (gavage) found a NOAEL >= 100 mg/kg/day for reproductive and developmental toxicity.

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

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

Aspiration hazard: Not classified.

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

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

Chemical Name	Species	Acute	Acute	Chronic
α-Hexylcinnamaldehyde	Fish	LC50 1.7 mg/L (96 hours)	N/E	N/E
α-Hexylcinnamaldehyde	Invertebrates	EC50 0.247 mg/L (48 hours)	N/E	EC10 69 µg/L (21 days)
α-Hexylcinnamaldehyde	Algae	EC50 >0.065 mg/L (72 hours) (mean measured test concentration)	N/E	N/E
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Fish	LC50 >0.57 mg/L (96 hours)	LC50 0.199 mg/L(96 hours) (calculated)	NOEC 0.053 mg/L (30 days)
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Invertebrates	EC50 0.48 mg/L (48 hours)	EC50 0.61 mg/L(48 hours) (OECD 202)	NOEC 0.023 mg/L (21 days)
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Algae	EC50 >0.42 mg/L (72 hours)	N/E	NOEC 0.4 mg/L(72 hours)
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Micro-organisms	EC50 >10000 mg/L (3 hours) (OECD 209)		

12.2. Persistence and degradability:

Chemical Name	Biodegradation
α-Hexylcinnamaldehyde	Readily biodegradable (OECD 301F)
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	Not readily biodegradable (OECD 301C)

12.3. Bioaccumulative potential:

BHT (Butylated Hydroxytoluene): Material is considered to have a moderate to high bioaccumulation potential.

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
α-Hexylcinnamaldehyde	N/E	5.3 (24°C)
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	230-2500	4.2-5.1

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
α-Hexylcinnamaldehyde	15800 (OECD 121)
2,6-Di-tert-butyl-p-cresol (Butylated hydroxytoluene (BHT))	14750

12.5. Results of PBT and vPvB assessment:

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

12.6. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

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

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

SECTION 14: Transport information

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

14.1. UN number: UN3082

14.2. UN proper shipping name:

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

14.3. Transport hazard class(es):

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

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

14.4. Packing group: III

14.5. Environmental hazards:

Marine pollutant: Marine Pollutant (IMDG code 2.9.3).

Hazardous substance (USA): Not Applicable

14.6. Special precautions for user:

Not Applicable

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

Not Applicable

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

SECTION 15: Regulatory information

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

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

UK Authorizations and/or restrictions on use: Not Applicable

Other UK information: No Additional Information

Chemical inventories:

Regulation	Status
Australian Inventory of Industrial Chemicals (AIIC):	Y
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	N
China Inventory of Existing Chemical Substances (IECSC):	Y
European EC Inventory (EINECS, ELINCS, NLP):	Y
Japan Existing and New Chemical Substances (ENCS):	N

Regulation	Status
Japan Industrial Safety and Health Law (ISHL):	Y
Korean Existing and Evaluated Chemical Substances (KECL):	Y
New Zealand Inventory of Chemicals (NZIoC):	Y
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Y
Taiwan Inventory of Existing Chemicals:	Y
U.S. Toxic Substances Control Act (TSCA) (Active):	Y

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

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

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

15.2. Chemical safety assessment:

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

SECTION 16: Other information

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

H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Reason for revision: Changes in Section(s): 1

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

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

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

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

Annex

Exposure Scenarios

Substance information:

Name of substance: (E)-2-benzylideneoctanal.
EC# 639-566-4 / CAS# 165184-98-5
UK REACH Registration number: DUIN Submitted
EU REACH Registration number: 01-2119533092-50-0005

List of exposure scenarios:

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

Exposure scenario (1): Compounding

1. Exposure scenario (1)

Short title of the exposure scenario:
Compounding

List of use descriptors:
Process category (PROC): PROC1, 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.
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:
The minimum risk management measure to protect against skin sensitising properties of substances is gloves (which will be considered for all PROCs).

Product characteristics:
Concentration of substance:
- PROC1, PROC3, PROC5, PROC15: Up to 100%.
- PROC8a, 8b (reception of goods), PROC9 (sampling): Up to 100%.
- PROC8a, 8b, 9 (filling): Up to 20%.

Physical state: liquid.
Vapour pressure: 0.068 Pa at 25 °C (default value in ART 10 Pa. ART provides an estimate of exposure to mist (i.e. small liquid droplets) if the vapour pressure at the respective process temperature is equal to or below 10 Pascal).
Fugacity: Low.
Operation conditions: Ambient temperature.

Amounts used:
This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:
Duration:
- PROC1, PROC15: 1 hour/day.
- PROC8a, 8b (reception of goods), PROC9 (sampling): 1 hour/day.
- PROC3, PROC5: 4 hours/day
- PROC8a, 8b, 9 (filling): 8 hours/day.

Frequency: <=240 days/year.

Other given operational conditions affecting workers exposure:
Location: Indoor/outdoor use.
Domain: Industrial use.

Technical conditions and measures at process level (source) to prevent release:
- PROC1: Not applicable (closed system).
- PROC3: Operation done under low level containment.
- PROC5, PROC8a, PROC8b, PROC9, PROC15: Not relevant.

Technical conditions and measures to control dispersion from source towards the worker:
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:
Wear suitable gloves (type EN374), coverall and eye protection (PPE23).

2.2 Control of environmental exposure

General:
Primary risk management measure: Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Product characteristics:
Physical state: liquid.

Amounts used:

Maximum daily use at a site: 145.8 kg/day (large/medium site); 72.9 kg/day (small site).
Amounts used in the EU: 3645 tons/year (large/medium site); 607.5 tons/year (small site).
Maximum annual use at a site: 36.5 tons/year (large/medium site); 18.2 tons/year (small site).
Fraction of EU tonnage used in region: 1.
Fraction of regional tonnage used locally: 0.01 (large/medium site); 0.03 (small site).

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

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=40,000 m3/day.
Local freshwater dilution factor: 41.
Local marine water dilution factor: 100.

Other given operational conditions affecting environmental exposure:
Common practices vary across sites thus conservative process release estimates used.
Release fraction to air from process (initial release prior to RMM): 0.025.
Release fraction to wastewater from process (initial release prior to RMM): 0.002 (large/medium site); 0.005 (small site).
Release fraction to soil from process (initial release prior to RMM): 0.

Technical conditions and measures at process level (source) to prevent release:
Risk from local environmental exposure is driven by marine sediment.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Indoor/Outdoor use.
Do not apply industrial sludge to natural soils.
No treatment of air emission required.
Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Organisational measures to prevent/limit releases from site:
Do not apply industrial sludge to natural soils.
Effluents are not assumed to be discharged to local marine water.

Conditions and measures related to municipal sewage treatment plant:
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Total efficiency of removal from wastewater after onsite and/or offsite (domestic treatment plant) RMMs (%): 92.59%.

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

Assessment method-Health: Advanced REACH Tool (ART) model (tier 2). Only highest figures are presented here.

Assessment method-Environment: ECETOC TRA version 3 in advanced mode and IFRA guidance on SpERCs. Reference: REACH Exposure scenarios for Fragrance Substances. Version 2.1/11 December 2012.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0.043 mg/m3	0.54	PROC8a, 8b, 9 (filling)
Worker, long-term, local, Dermal	5.49 mg/kg bw/day	0.85	PROC8a (reception of goods)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.0000881 mg/L (a) / 0.000101 mg/L (b)	0.0699 (a)/ 0.0801 (b)	(a) large/medium site/ (b) small site
Freshwater sediment	0.139 mg/kg dw (a)/ 0.16 mg/ kg dw (b)	0.044 (a)/ 0.050 (b)	(a) large/medium site/ (b) small site
Marine water	0.0000248 mg/L (a) / 0.0000301 mg/L	0.20 (a) / 0.24 (b)	(a) large/medium site/ (b) small site
Marine water sediment	0.0392 mg/kg dw (a) / 0.0476 mg/kg dw (b)	0.61 (a) / 0.74 (b)	(a) large/medium site/ (b) small site
Soil	0.00176 mg/kg dw (a)/ 0.00107 mg/kg dw (b)	0.044 (a)/ 0.027 (b)	(a) large/medium site/ (b) small site
STP	0.029 mg/L (a)/ 0.036 mg/L (b)	0.0029 (a)/ 0.0036 (b)	(a) large/medium site/ (b) small site
Air	0.000701 mg/m3 (a)/ 0.00035 mg/m3 (b)	N/A	(a) large/medium site/ (b) small site

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

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

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

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

Environment: Risk assessment 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. The risk from environmental exposure is driven by release of substance to freshwater which impact directly on the most sensitive RCRs, the ones linked to the sediment compartment. The refinements can be done using additional removal efficiency for wastewater (other than municipal WWTP). It can be achieved using onsite/offsite technologies, either alone or in combination. The refinement can also make on dilution factor using the river flow or the effluent discharge rate of local WWTP either alone or in combinaison. Default dilution factor is raised up to 41 according the EU TGD PART IV 5.3 Conclusion on dilution.

The scaling rules are summarized in the following equation and validated until a amount used at main local site of 330 tons per year.
Scaling rules equation:
RCRDU=RCRES X (MDU / MES) / (FdilutionDU/FdilutionES) X ((1-FremovalDU) / (1-FremovalES))
- RCRDU : risk characterization ratio of freshwater sediment for Downstream User
- RCRES : risk characterization ratio of freshwater sediment in CSR exposure scenari
- MDU : amount of substance used at downstream user site per year (tons/year)
- MES : maximum aceptable amount used at main local site in CSR exposure scenario (tons/year)
- FdilutionDU : Sprecific fraction of dilution for downstream user
- FdilutionES : Fraction of dilution used in CSR
- For information: Fdilution= (river flow) / (Effluent discharge rate of local STP)
- FremovalDU : fraction of water removal due of additional RMMs corresponding to its efficiency
- FremovalES: no additional RMM used in CSR (should be 0)

Exposure scenario (2): Formulation

1. Exposure scenario (2)

Short title of the exposure scenario:
Formulation

List of use descriptors:
Process category (PROC): PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15
Environmental release category (ERC): ERC2 (SpERC AISE 2.1.a,g; AISE 2.1.b,h; AISE 2.1.c,i; AISE 2.1.j CE/AISE 2.3.a CE 2.1.a; AISE 2.1.k CE/AISE 2.3.b CE 2.1.b; AISE 2.1.l CE/AISE 2.3.c CE 2.1.c; CE 2.2.a-c; CE 2.1.d-j).

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

Name of contributing environmental scenario and corresponding ERCs:
ERC2 Formulation into mixture.
SpERC AISE 2.1- 2.3: Formulation of Detergents/Maintenance Products; Formulation of solid cosmetic and home care products.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
The minimum risk management measure to protect against skin sensitising properties of substances is gloves (which will be considered for all PROCs).

Product characteristics:
Concentration of substance:
- PROC1, PROC2, PROC3, PROC5, PROC15: Up to 20%.
- PROC8a, 8b (reception of goods), PROC9 (sampling): Up to 20%.
- PROCPROC8a, 8b, 9 (filling), PROC14: Up to <5%.

Physical state: liquid.
Vapour pressure: 0.068 Pa at 25 °C (default value in ART 10 Pa. ART provides an estimate of exposure to mist (i.e. small liquid droplets) if the vapour pressure at the respective process temperature is equal to or below 10 Pascal).
Fugacity: Low.
Operation conditions: Ambient temperature.

Amounts used:
This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:
Duration:
- PROC1, PROC14, PROC15: 1 hour/day.

- PROC8a, 8b (reception of goods), PROC9 (sampling): 1 hour/day.
- PROC2, PROC3, PROC5; 4 hours/day
- PROC8a, 8b, 9 (filling): 8 hours/day.

Frequency: <=240 days/year.

Other given operational conditions affecting workers exposure:
Location: Indoor/outdoor use.
Domain: Industrial use.

Technical conditions and measures at process level (source) to prevent release:
- PROC1: Not applicable (closed system).
- PROC2, PROC3: Operation done under low level containment.
- PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15: Not relevant.

Technical conditions and measures to control dispersion from source towards the worker:
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:
Wear suitable gloves (type EN374), coverall and eye protection (PPE23).

2.2 Control of environmental exposure

General:
Primary risk management measure: Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Product characteristics:
Physical state: liquid.

Amounts used:
Maximum daily use at a site:
- AISE 2.1.a,g: 191 kg/day.
- AISE 2.1.b,h: 19.1 kg/day.
- AISE 2.1.c,i: 9.78 kg/day.
- AISE 2.1.j CE/AISE 2.3.a CE 2.1.a: 17.9 kg/day.
- AISE 2.1.k CE/AISE 2.3.b CE 2.1.b: 7.65 kg/day.
- AISE 2.1.l CE/AISE 2.3.c CE 2.1.c: 4.59 kg/day.
- CE 2.2.a-c: 245 kg/day.
- CE 2.1.d-j: 0.765 kg/day.

Amounts used in the EU:
- AISE 2.1.a,g: 1590 tons/year.
- AISE 2.1.b,h: 595 tons/year.
- AISE 2.1.c,i: 489 tons/year.
- AISE 2.1.j CE/AISE 2.3.a CE 2.1.a: 447 tons/year.
- AISE 2.1.k CE/AISE 2.3.b CE 2.1.b; AISE 2.1.l CE/AISE 2.3.c CE 2.1.c: 191 tons/year.
- CE 2.2.a-c: 680 tons/year.
- CE 2.1.d-j: 63.8 tons/year.

Maximum annual use at a site:
- AISE 2.1.a,g: 47.8 tons/year.
- AISE 2.1.b,h: 4.76 tons/year.
- AISE 2.1.c,i: 2.45 tons/year.
- AISE 2.1.j CE/AISE 2.3.a CE 2.1.a: 4.47 tons/year.
- AISE 2.1.k CE/AISE 2.3.b CE 2.1.b: 1.91 tons/year.
- AISE 2.1.l CE/AISE 2.3.c CE 2.1.c: 1.15 tons/year.
- CE 2.2.a-c: 61.2 tons/year.
- CE 2.1.d-j: 0.191 tons/year.

Fraction of EU tonnage used in region: 0.1.
Fraction of regional tonnage used locally:
- AISE 2.1.a,g: 0.3.
- AISE 2.1.b,h: 0.08.
- AISE 2.1.c,i: 0.05.
- AISE 2.1.j CE/AISE 2.3.a CE 2.1.a; AISE 2.1.k CE/AISE 2.3.b CE 2.1.b: 0.1.
- AISE 2.1.l CE/AISE 2.3.c CE 2.1.c: 0.06.
- CE 2.2.a-c: 0.9.
- CE 2.1.d-j: 0.03.

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

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).
Local freshwater dilution factor: 10 (default).
Local marine water dilution factor: 100 (default).

Other given operational conditions affecting environmental exposure:
Common practices vary across sites thus conservative process release estimates used.
Release fraction to air from process (initial release prior to RMM): 0.
Release fraction to wastewater from process (initial release prior to RMM):
- AISE 2.1.a,g: 0.0001.
- AISE 2.1.b,h; AISE 2.1.j CE/AISE 2.3.a CE 2.1.a: 0.001.
- AISE 2.1.c,i; AISE 2.1.k CE/AISE 2.3.b CE 2.1.b: 0.002.

- AISE 2.1.l CE/AISE 2.3.c CE 2.1.c: 0.004.
- CE 2.2.a-c: 0.
- CE 2.1.d-j: 0.02.

Release fraction to soil from process (initial release prior to RMM): 0.

Technical conditions and measures at process level (source) to prevent release:
Risk from local environmental exposure is driven by terrestrial environment.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Indoor/Outdoor use.
Do not apply industrial sludge to natural soils.
No treatment of air emission required.
Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Organisational measures to prevent/limit releases from site:
Do not apply industrial sludge to natural soils.

Conditions and measures related to municipal sewage treatment plant:
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Total efficiency of removal from wastewater after onsite and/or offsite (domestic treatment plant) RMMs (%): 92.59%.

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

Assessment method-Health: Advanced REACH Tool (ART) model (tier 2). Only highest figures are presented here.

Assessment method-Environment: ECETOC TRA version 3 in advanced mode and IFRA guidance on SpERCs. Only highest figures are presented here.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0.0089 mg/m3	0.11	PROC9 (sampling), PROC15
Worker, long-term, local, Dermal	1.646 mg/kg bw/day	0.26	PROC5, PROC8a (reception of goods)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.000107 mg/L	0.085	AISE 2.1.c,i
Freshwater sediment	0.17 mg/kg dw	0.053	AISE 2.1.c,i
Marine water	0.0000107 mg/L	0.085	AISE 2.1.c,i
Marine water sediment	0.017 mg/kg dw	0.27	AISE 2.1.c,i
Soil	0.0326 mg/kg dw	0.819	AISE 2.1.c,i
STP	0.0098 mg/L	0.00098	AISE 2.1.c,i
Air	0.00000651 mg/m3	N/A	AISE 2.1.c,i

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

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

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

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

Exposure scenario (3): Industrial use of fragranced products

1. Exposure scenario (3)

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

List of use descriptors:
Process category (PROC): PROC1, PROC2, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13
Environmental release category (ERC): ERC4, ERC8a, ERC8d

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).
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:
Industrial use of Laundry products:
- AISE P101 Laundry detergent: Automatic process (PROC2, PROC8a, PROC8b).
- AISE P104 Conditioner (softener/starch): Automatic process (PROC2, PROC8a, PROC8b).
- AISE P107 Laundry aid (gasing): Automatic process (PROC2, PROC8a, PROC8b).
- AISE P110 Laundry aid (non-gasing): Automatic process (PROC2, PROC8a, PROC8b).

Industrial use of Vehicle cleaning Products:
- AISE P707 Train cleaner: Semi-Automatic process (PROC4; PROC8a, PROC8b).
- AISE P708 Aeroplane cleaner: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- AISE P709 Car wash product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- AISE P710 Car wash product: Spray and rinse process (PROC7 (spraying/moderate application rate/near field/<1 hour), PROC8a, PROC8b).
- AISE P711 Car wash product: Spray and wipe manual process (PROC8a, PROC8b)
- AISE P712 Dewaxing product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- AISE P713 Boat cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P714 Boat cleaner: Spray and wipe manual process (PROC7 (spraying/moderate application rate/near field/<1 hour), PROC8a, PROC8b).

Industrial use of Food beverage and pharmacos products:
- AISE P801 Food process cleaner: Cleaning In Place process (PROC1, PROC8a, PROC8b).
- AISE P802 Food process cleaner: Semi closed cleaning process (PROC4, PROC8a, PROC8b).
- AISE P803 Chain maintenance product: Automatic spray process (PROC7 (spraying/moderate application rate/far field), PROC8a, PROC8b, PROC13).
- AISE P804 Chain maintenance product: Automatic drip and brush process (PROC8a, PROC8b, PROC13).
- AISE P805 Defoaming product: Automatic process (PROC8a, PROC8b).
- AISE P806 Foam cleaner: Semi-Automatic with venting process (PROC7 (spraying/moderate application rate/near field/<1 hour), PROC8a, PROC8b).
- AISE P807 Foam cleaner: Semi-Automatic without venting process (PROC7 (spraying/moderate application rate/near field/<1 hour), PROC8a, PROC8b).
- AISE P809 Animal housing care:Semi-Automatic process (PROC8a, PROC8b, PROC10).
- AISE P810 Disinfection product: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- AISE P811 Disinfection product: Fogging and gassing Semi-automatic process (PROC7 (spraying/moderate application rate/near field/<1 hour), PROC8a, PROC8b).

Industrial Use of Facade/surface Cleaning Products:
- AISE P906 Facade/surface cleaner: High pressure process (PROC7 (spraying/moderate application rate/near field/>4 hours), PROC8a, PROC8b).
- AISE P907 Facade/surface cleaner: Medium pressure process (PROC7 (spraying/moderate application rate/near field/>4 hours; spraying/low application rate/near field), PROC8a, PROC8b).

Industrial use of Metal Treatment Products:
- AISE P1004 Metal cleaner (degreaser, descaler, etch): Manual process (PROC8a, PROC8b, PROC10).
- AISE P1005 Metal cleaner (degreaser, descaler, etch): Semi-Automatic process (PROC4, PROC8a, PROC8b).
- AISE P1006 Metal cleaner: Automatic process (degreaser, descaler, etch) (PROC2, 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

General:
The minimum risk management measure to protect against skin sensitising properties of substances is gloves (which will be considered for all PROCs). PROC7 (spraying/moderate application rate/near field/>4 hours): Wear a respirator conforming to EN140 with Type A/P2 filter or better.

Product characteristics:
Concentration of substance: Up to 0.2-0.3%.
Physical state: liquid.
Vapour pressure: 0.068 Pa at 25 °C (default value in ART 10 Pa. ART provides an estimate of exposure to mist (i.e. small liquid droplets) if the vapour pressure at the respective process temperature is equal to or below 10 Pascal).
Fugacity: Low.
Operation conditions: Ambient temperature.

Amounts used:
This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:
Duration:
- PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13: 8 hours/day.
- PROC7 (spraying/moderate application rate/far field): 8 hours/day.
- PROC7 (spraying/moderate application rate/near field/> 4 hours): 8 hours/day.
- PROC7 (spraying/low application rate/near field): 8 hours/day.
- PROC7 (spraying/moderate application rate/near field/<1 hour): 1 hour/day.

Frequency: <=240 days/year.

Other given operational conditions affecting workers exposure:

Location: Indoor use.
Domain: Industrial use.

Technical conditions and measures at process level (source) to prevent release:
- PROC1: Not applicable (closed system).
- PROC2, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13: Not relevant.

Technical conditions and measures to control dispersion from source towards the worker:
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:
- PROC7 (spraying/moderate application rate/near field/>4 hours): Wear a respirator conforming to EN140 with Type A/P2 filter or better.
- PROC1, PROC2, PROC4, PROC7 (spraying/moderate application rate/far field; spraying/low application rate/near field; spraying/moderate application rate/near field/<1 hour),
- PROC8a, PROC8b, PROC10, PROC13: Not required.
Wear suitable gloves (type EN374), coverall and eye protection (PPE23).

2.2 Control of environmental exposure

General:
Primary risk management measure: Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Product characteristics:
Physical state: liquid.

Amounts used:
Maximum daily use at a site: 0.016 kg/day.
Amounts used in the EU: 2030 tons/year.
Maximum annual use at a site: 0.00609 tons/year.
Fraction of EU tonnage used in region: 0.004.
Fraction of regional tonnage used locally: 0.00075.

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

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).
Local freshwater dilution factor: 10 (default).
Local marine water dilution factor: 100 (default).

Other given operational conditions affecting environmental exposure:
Common practices vary across sites thus conservative process release estimates used.
Release fraction to air from process (initial release prior to RMM): 1.
Release fraction to wastewater from process (initial release prior to RMM): 1.
Release fraction to soil from process (initial release prior to RMM): 0 (indoors), 0.2 (outdoors).

Technical conditions and measures at process level (source) to prevent release:
Risk from local environmental exposure is driven by terrestrial environment.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Indoor/Outdoor use.
Do not apply industrial sludge to natural soils.
No treatment of air emission required.
Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Organisational measures to prevent/limit releases from site:
Do not apply industrial sludge to natural soils.
Prevent environmental discharge consistent with regulatory requirements.

Conditions and measures related to municipal sewage treatment plant:
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Total efficiency of removal from wastewater after onsite and/or offsite (domestic treatment plant) RMMs (%): 92.59%.

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

Assessment method-Health: Advanced REACH Tool (ART) model (tier 2). Only highest figures are presented here.

Assessment method-Environment: ECETOC TRA version 3 in advanced mode and IFRA guidance on SpERCs. Reference: REACH Exposure scenarios for Fragrance Substances. Version 2.1/11 December 2012.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0.058 mg/m3	0.72	PROC7
Worker, long-term, local, Dermal	0.857 mg/kg bw/day	0.13	PROC7

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.000097 mg/L	0.077	
Freshwater sediment	0.154 mg/kg dw	0.048	

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Marine water	0.0000097 mg/L	0.077	
Marine water sediment	0.0154 mg/kg dw	0.24	
Soil	0.0279 mg/kg dw	0.70	
STP	0.0083 mg/L	0.00083	
Air	0.00000651 mg/m3	N/A	

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

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

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

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

Exposure scenario (4): Professional use of fragranced products

1. Exposure scenario (4)

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

List of use descriptors:
Product category (PC): PC3, PC28, PC31, PC35, PC36, PC39
Process category (PROC): PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19
Environmental release category (ERC): ERC8a, ERC8d

List of names of contributing worker scenarios and corresponding PROCs:
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC4 Chemical production where opportunity for exposure arises.
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC10 Roller application or brushing. This includes application of paints, coatings, removers, adhesives or cleaning agents to surfaces with potential exposure arising from splashes.
PROC11 Non industrial spraying. Air dispersive techniques i.e. dispersion into air (= atomization) by e.g. pressurized air, hydraulic pressure or centrifugation, applicable for liquids and powders.
PROC13 Treatment of articles by dipping and pouring.
PROC19 Manual activities involving hand contact. Addresses tasks, where exposure of hands and forearms can be expected; no dedicated tools or specific exposure controls other than PPE can be put in place.

Name of contributing environmental scenario and corresponding ERCs:
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor).

Further explanations:
Professional Use of Laundry products:
- AISE P102 Laundry detergent: Semi-automatic process (PROC8a, PROC8b).
- AISE P105 Conditioner (softener/starch): Semi-automatic process (PROC8a, PROC8b).
- AISE P106 Conditioner (softener/starch): Manual process (PROC8a, PROC8b).
- AISE P108 Laundry aid (gasing): Semi-automatic process (PROC8a, PROC8b).
- AISE P109 Laundry aid (gasing): Manual process (PROC8a, PROC8b).
- AISE P111 Laundry aid (non-gasing): Semi-automatic process (PROC8a, PROC8b).
- AISE P112 Laundry aid (non-gasing): Manual process (PROC8a, PROC8b).
- AISE P113 Prespotter/Stain remover: Manual process (PROC11 (spraying/low application rate/near field)).

Professional Use of Dishwash products:
- AISE P201 Dishwash product: Manual process (PROC8a, PROC8b, PROC10).
- AISE P202 Dishwash product: Automatic process (PROC2, PROC8a;, PROC8b).
- AISE P203 Dishwash product: Semi-automatic process (PROC8a, PROC8b).
- AISE P204 Rinse aid: Automatic process (PROC2, PROC8a, PROC8b).

Professional Use of General surface cleaning products:
- AISE P301 General purpose cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P302 General purpose cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P303 Kitchen cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P304 Kitchen cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P305 Sanitary cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P306 Sanitary cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P307 Descaling agent: Manual process (PROC11 (spraying/low application rate/near field)).
- AISE P308 Descaling agent: Spray and rinse manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P309 Descaling agent: Dipping process (PROC13).
- AISE P310 Oven/Grill Cleaner: Manual process (PROC10).
- AISE P311 Oven/Grill Cleaner: Spray and wipe manual process (PROC11 (spraying/low application rate/near field)).

- AISE P312 Glass cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P313 Glass cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P314 Surface disinfectant: Manual process (PROC8a, PROC8b, PROC10).
- AISE P315 Surface disinfectant: Spray and rinse manual process (PROC8a,PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P316 Metal cleaning agent: Manual process (PROC8a, PROC8b, PROC10).
- AISE P317 Wet wipe (e.g. oven grill, wet wipe): Manual process (PROC10).

Professional Use of Floor care products:
- AISE P401 Floor cleaner: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- AISE P402 Floor cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P403 Floor cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P404 Floor stripper: Manual process (PROC8a, PROC8b, PROC10).
- AISE P405 Floor stripper: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- AISE P406 Polish/impregnating agent: Manual process (PROC10).
- AISE P407 Polish/impregnating agent: Semi-Automatic process (PROC10).
- AISE P408 Polish/impregnating agent: Spray and wipe manual process (PROC11 (spraying/low application rate/near field)).
- AISE P409 Carpet cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P410 Carpet cleaner: Semi-Automatic process (PROC8a, PROC8b, PROC10).
- AISE P411 Carpet cleaner: Spray and brush manual process (PROC11 (spraying/low application rate/near field)).

Professional Use of Maintenance Products :
- AISE P601 Furniture care product: Manual process (PROC10).
- AISE P602 Furniture care product: Spray and wipe manual process (PROC11 (spraying/low application rate/near field)).
- AISE P603 Leather care product: Manual process (PROC10).
- AISE P604 Leather care product: Spray and wipe manual process (PROC11 (spraying/low application rate/near field)).
- AISE P605 Leather care product: Automatic process (PROC2, PROC8a, PROC8b).
- AISE P606 Drain unblocker: Manual process (PROC8a, PROC8b).
- AISE P607 Drain cleaner: Manual process (PROC8a, PROC8b).
- AISE P609 Stainless steel care: Spray and wipe manual process (PROC11 (spraying/low application rate/near field)).

Professional Use of Vehicle cleaning Products:
- AISE P701 Car wash product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- AISE P702 Car wash product: Spray and rinse process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P703 Car wash product: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).
- AISE P704 Dewaxing product: Semi-Automatic process (PROC4, PROC8a, PROC8b).
- AISE P705 Boat cleaner: Manual process (PROC8a, PROC8b, PROC10).
- AISE P706 Boat cleaner: Spray and wipe manual process (PROC8a, PROC8b, PROC11 (spraying/low application rate/near field)).

Professional Use of Food beverage and pharmacos products:
- AISE P808 Animal housing care: Manual process (PROC8a, PROC8b, PROC10).

Professional Use of Facade/surface Cleaning Products:
- AISE P901 Facade/surface cleaner: High pressure process (PROC8a, PROC8b, PROC11 (spraying/moderate application rate/near field/>4 hours)).
- AISE P902 Facade/surface cleaner: Medium pressure process (PROC8a, PROC8b, PROC11 (spraying/moderate application rate/near field/<1 hour)).

Professional Use of Medical Devices:
- AISE P1101 Medical devices: Semi-automatic process (PROC4, PROC8a, PROC8b).
- AISE P1102 Medical devices: Dipping process (PROC8a, PROC8b, PROC13).
- AISE P1103 Medical devices: Manual process (PROC8a, PROC8b, PROC10).
- AISE P1104 Medical devices: Spray process (PROC8a, PROC8b, PROC11 (spraying/moderate application rate/near field/<1 hour)).

Professional Use of Hand Cleaners:
- AISE P1300 Hand-mixing with intimate contact (only PPE available)(PROC19).

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:

The minimum risk management measure to protect against skin sensitising properties of substances is gloves (which will be considered for all PROCs). PROC11 (spraying/moderate application rate/near field/>4 hours): Wear a respirator conforming to EN140 with Type A/P2 filter or better.

Product characteristics:

Concentration of substance: Up to 0.2-0.3%.
Physical state: liquid.
Vapour pressure: 0.068 Pa at 25 °C (default value in ART 10 Pa. ART provides an estimate of exposure to mist (i.e. small liquid droplets) if the vapour pressure at the respective process temperature is equal to or below 10 Pascal).
Fugacity: Low.
Operation conditions: Ambient temperature.

Amounts used:

This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:

Duration:
- PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13, PROC19: 8 hours/day.
- PROC11 (spraying/moderate application rate/near field/> 4 hours): 8 hours/day.
- PROC11 (spraying/low application rate/near field): 8 hours/day.
- PROC11 (spraying/moderate application rate/near field/<1 hour): 1 hour/day.

Frequency: <=240 days/year.

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:
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:
- PROC11 (spraying/moderate application rate/near field/>4 hours): Wear a respirator conforming to EN140 with Type A/P2 filter or better.
- PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11 (spraying/low application rate/near field; spraying/moderate application rate/near field/<1 hour),
- PROC13, PROC19: Not required.
Wear suitable gloves (type EN374), coverall and eye protection (PPE23).

2.2 Control of environmental exposure

General:
Primary risk management measure: Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Product characteristics:
Physical state: liquid.

Amounts used:
Maximum daily use at a site: 0.016 kg/day.
Amounts used in the EU: 2030 tons/year.
Maximum annual use at a site: 0.00609 tons/year.
Fraction of EU tonnage used in region: 0.004.
Fraction of regional tonnage used locally: 0.00075.

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

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).
Local freshwater dilution factor: 10 (default).
Local marine water dilution factor: 100 (default).

Other given operational conditions affecting environmental exposure:
Common practices vary across sites thus conservative process release estimates used.
Release fraction to air from process (initial release prior to RMM): 1.
Release fraction to wastewater from process (initial release prior to RMM): 1.
Release fraction to soil from process (initial release prior to RMM): 0 (indoors), 0.2 (outdoors).

Technical conditions and measures at process level (source) to prevent release:
Risk from local environmental exposure is driven by terrestrial environment.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Indoor/Outdoor use.
No treatment of air emission required.
Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Organisational measures to prevent/limit releases from site:
Prevent environmental discharge consistent with regulatory requirements.

Conditions and measures related to municipal sewage treatment plant:
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Total efficiency of removal from wastewater after onsite and/or offsite (domestic treatment plant) RMMs (%): 92.59%.

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

Assessment method-Health: Advanced REACH Tool (ART) model (tier 2). Only highest figures are presented here.

Assessment method-Environment: ECETOC TRA version 3 in advanced mode and IFRA guidance on SpERCs. Reference: REACH Exposure scenarios for Fragrance Substances. Version 2.1/11 December 2012.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Inhalation	0.041 mg/m3	0.51	PROC8a, PROC8b
Worker, long-term, local, Dermal	2.83 mg/kg bw/day	0.44	PROC19

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.000097 mg/L	0.077	
Freshwater sediment	0.154 mg/kg dw	0.048	
Marine water	0.0000097 mg/L	0.077	
Marine water sediment	0.0154 mg/kg dw	0.24	
Soil	0.0279 mg/kg dw	0.70	

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
STP	0.0083 mg/L	0.00083	
Air	0.00000651 mg/m3	N/A	

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

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

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

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

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

Exposure scenario (5): Consumer use of fragranced products

1. Exposure scenario (5)

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

List of use descriptors:
Product category (PC): PC3, PC8, PC31, PC35, PC36, 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:
- AISE C17 - Air fresheners aerosol.
- AISE C18 - Air fresheners non aerosol.

PC8 Biocidal products: consumer exposure to this product category is assessed under the Biocide Directive.
PC31 Polishes and wax blends:
- AISE C20 – Furniture floor and leather care.

PC35 Washing and cleaning products:
- AISE C1 - Laundry regular.
- AISE C2 - Laundry compact.
- AISE C3 - Fabric conditioners.
- AISE C4 - Laundry additives.
- AISE C5 - Hand dishwashing.
- AISE C6 - Machine dishwashing.
- AISE C7 - Surface cleaners.
- AISE C8 - Toilet cleaners.
- AISE C10 - Oven cleaners.
- AISE C11 - Carpet cleaners.
- AISE C12 - Laundry aids.
- AISE C15 – Wipes.
- (AISE C13 – Drain products and AISE C14 – Descalers which were assessed apart from PC35 even if listed in PC35).

PC36 Water softeners:
- AISE C9 - Water softeners.

PC39 Cosmetics, personal care products: consumer exposure to this product category is assessed under the Cosmetic Directive.

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

Product characteristics:
Concentration of substance: Unless otherwise stated, covers concentrations up to 5%.
- PC3 (AISE C17): up to 2.4%.
- PC3 (AISE C18), PC31: up to 2.5%.
- PC35 (AISE C10, C11, C13, C14, C15): up to 2.5%.
- PC35 (AISE C1): up to 0.16%.
- PC35 (AISE C2): up to 0.066%.
- PC35 (AISE C3): up to 0.086%.
- PC35 (AISE C4): up to 0.06%.
- PC35 (AISE C5): up to 0.09%.
- PC35 (AISE C6): up to 0.03%.
- PC35 (AISE C7): up to 0.15%.
- PC35 (AISE C8): up to 0.076%.
- PC35 (AISE C12): up to 0.026%.
- PC36 (AISE C9): up to 0.5%.

Physical state: liquid.
Vapour pressure: 0.068 Pa.
Operation conditions: Ambient temperature.

Amounts used:

Use amounts: Unless otherwise stated, covers use amounts up to 250 g.
- PC3 (AISE C17): for each use event covers amounts up to 8.4 g
- PC3 (AISE C18): for each use event covers amounts up to 40 g
- PC31: for each use event covers amounts up to 550 g.
- PC35 (AISE C1): for each use event covers amounts up to 150 g
- PC35 (AISE C2): for each use event covers amounts up to 90 g
- PC35 (AISE C3): for each use event covers amounts up to 135 g
- PC35 (AISE C4): for each use event covers amounts up to 70 g
- PC35 (AISE C5, C12): for each use event covers amounts up to 10 g
- PC35 (AISE C6): for each use event covers amounts up to 50 g
- PC35 (AISE C7): for each use event covers amounts up to 60 g
- PC35 (AISE C8): for each use event covers amounts up to 30 g
- PC35 (AISE C10): for each use event covers amounts up to 23.4 g.
- PC35 (AISE C11, C13): for each use event covers amounts up to 500 g
- PC35 (AISE C14): for each use event covers amounts up to 37 g
- PC35 (AISE C15): for each use event covers amounts up to 26 g
- PC36 (AISE C9): for each use event covers amounts up to 3.42 g.

Skin contact area: Unless otherwise stated, covers skin contact area up to 857.5 cm2.
- PC3 (AISE C17): up to 17500 cm2.
- PC3 (AISE C18): up to 35.70 cm2.
- PC31 (non-spray): up to 430 cm2.
- PC35 (AISE C10), PC36 (AISE C9): up to 428.75 cm2.
- PC35 (AISE C11): up to 860 cm2.
- PC35 (AISE C13, C14, C15): up to 215 cm2.

Frequency and duration of use/exposure:

Duration: Unless otherwise stated, covers exposure covers exposure up to 8 hours/event.
- PC3 (AISE C17): covers exposure up to 6 seconds/event.
- PC31 (non-spray): covers exposure up to 1.5 hours/event.
- PC31 (spray): covers exposure up to 3 minutes/event.
- PC35 (AISE C1, C2, C3, C4): covers exposure up to 0.17 hours/event.
- PC35 (AISE C5): covers exposure up to 0.5 hours/event.
- PC35 (AISE C6, C8), PC36 (AISE C9): covers exposure up to 0.02 hours/event.
- PC35 (AISE C7): covers exposure up to 0.33 hours/event.
- PC35 (AISE C10, C12): covers exposure up to 1 hour/event.
- PC35 (AISE C11): covers exposure up to 1.8 hours/event.
- PC35 (AISE C13): covers exposure up to 0.75 minutes/event.
- PC35 (AISE C14): covers exposure up to 7.6 minutes/event.
- PC35 (AISE C15): covers exposure up to 0.08 hours/event.

Frequency: Unless otherwise stated, covers use frequency up to 4 times/day.
- PC3 (AISE C17), PC35 (AISE C15): up to 1 time/day; 365 days/year.
- PC3 (AISE C18): up to 1 time/day; 183 days/year.
- PC31 (non-spray): up to 1 time/day; 2 days/year.
- PC31 (spray): up to 1 time/day; 1 day/year.
- PC35 (AISE C1, C2, C6): up to 1 time/day; 261 days/year.
- PC35 (AISE C3): up to 1 time/day; 209 days/year.
- PC35 (AISE C4, C14): up to 1 time/day; 156 days/year.
- PC35 (AISE C5): up to 2 times/day; 365 days/year.
- PC35 (AISE C7, C12), PC36 (AISE C9): up to 1 time/day; 104 days/year.
- PC35 (AISE C8): up to 1 time/day; 52 days/year.
- PC35 (AISE C10): up to 1 time/day; 26 days/year.
- PC35 (AISE C11): up to 1 time/day; 0.5 days/year.
- PC35 (AISE C13): up to 1 time/day; 4 days/year.

Other given operational conditions affecting consumers exposure:

Covers use in room size:
- PC3 (AISE C17, C18): room size of 2.5 m3.
- PC31, PC35 (AISE C11): room size of 58 m3.
- PC35 (AISE C1, C2, C3, C4, C5, C6, C7, C8, C12, C15): room size of 20 m3.
- PC36 (AISE C9): room size of 20 m3.
- PC35 (AISE C10): room size of 15 m3.

2.2 Control of environmental exposure

General:

Primary risk management measure: Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Product characteristics:

Physical state: liquid.

Amounts used:

Maximum daily use at a site: 0.016 kg/day.
Amounts used in the EU: 2030 tons/year.
Maximum annual use at a site: 0.00609 tons/year.
Fraction of EU tonnage used in region: 0.004.
Fraction of regional tonnage used locally: 0.00075.

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

Environmental factors not influenced by risk management:
Flow rate of receiving surface water: >=18,000 m3/day (default).
Local freshwater dilution factor: 10 (default).
Local marine water dilution factor: 100 (default).

Other given operational conditions affecting environmental exposure:
Common practices vary across sites thus conservative process release estimates used.
Release fraction to air from process (initial release prior to RMM): 1.
Release fraction to wastewater from process (initial release prior to RMM): 1.
Release fraction to soil from process (initial release prior to RMM): 0 (indoors), 0.2 (outdoors).

Technical conditions and measures at process level (source) to prevent release:
Risk from local environmental exposure is driven by terrestrial environment.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Indoor/Outdoor use.
No treatment of air emission required.
Provide onsite an industrial wastewater treatment plant or a domestic sewage treatment plant.

Organisational measures to prevent/limit releases from site:
Prevent environmental discharge consistent with regulatory requirements.

Conditions and measures related to municipal sewage treatment plant:
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Total efficiency of removal from wastewater after onsite and/or offsite (domestic treatment plant) RMMs (%): 92.59%.

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

Assessment method-Health: PC3: Air fresheners – aerosol (AISE C17) and Air fresheners – non aerosol (AISE C18): ECETOC TRA version 2 Tier 1 and Tier 1+, AISE REACT and ConsExpo 5 beta models were used.

PC31, PC35 and PC36: ECETOC TRA version 2 Tier 1 and Tier 1+ were used. AISE REACT was used for PC31. ConsExpo 5 beta model was used for PC31, AISE C10, C11 and C15 in PC35 and for PC36.

Other PCs - Drain products (AISE C13) and Descalers (AISE C14): ConsExpo 5 beta model was used.

Only highest figures are presented here.

Assessment method-Environment: ECETOC TRA version 3 in advanced mode and IFRA guidance on SpERCs. Reference: REACH Exposure scenarios for Fragrance Substances. Version 2.1/11 December 2012.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0.26 mg/kg bw/day	0.028	PC35 (AISE C5)
Consumer, long-term, systemic, Inhalation	0.0053 mg/kg bw/day	0.84	PC3 (AISE C17)
Consumer, long-term, systemic, Oral	0.0074 mg/kg bw/day	0.14	PC3 (AISE C17)
Consumer, long-term, systemic, Combined routes	N/A	0.98	PC3 (AISE C17)
Consumer, long-term, local, Dermal	0.071 mg/cm2/day	0.90	PC3 (AISE C18)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0.000097 mg/L	0.077	
Freshwater sediment	0.154 mg/kg dw	0.048	
Marine water	0.0000097 mg/L	0.077	
Marine water sediment	0.0154 mg/kg dw	0.24	
Soil	0.0279 mg/kg dw	0.70	
STP	0.0083 mg/L	0.00083	
Air	0.00000651 mg/m3	N/A	

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.