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

Revision date: 2023-02-16
Supercedes: 2022-01-19

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

1.1. Product identifier:

Product trade name:	Kalama* C-6 Aldehyde FCC
Company product number:	C6A
UK REACH registration number:	DUIN Submitted
Substance name:	Hexanal
Substance identification number:	EC 200-624-5
Other means of identification:	Hexaldehyde

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

Uses:	Flavor and fragrance ingredient/additive. 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: FF.Regulatory@lanxess.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:

Flammable Liquid, category 3, H226
Skin Irritation, category 2, H315
Eye Irritation, category 2, H319

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:
H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use carbon dioxide, dry chemical, foam to extinguish.

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
0000066-25-1	Hexanal	99-100	Eye Irrit. 2- Flam. Liq. 3- Skin Irrit. 2	H226-315-319

CAS-No.	Chemical Name	Weight%	UK REACH Registration No.	EC/List Number
0000066-25-1	Hexanal	99-100	DUIN Submitted	200-624-5

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

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

SECTION 4: First aid measures

4.1. Description of first aid measures:

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

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

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

Inhalation: If affected, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a POISON CENTER or doctor/physician if you feel unwell.

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

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

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

Dizziness, Headache, Irritation, Nausea. 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 ABC dry chemical, foam, CO2, or water fog. Water may be ineffective due to the low flash point.

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

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Issue warning: flammable liquid. Eliminate all ignition sources. Ventilate the area. If spill

is large, be prepared to isolate the hazard area. Deny access to the spill area to persons who are not involved in the cleanup and/or who have not been properly trained in spill management of hazardous/flammable liquids. Vapors may explode if ignited in an enclosed area. Run off to sewer may cause a fire or explosion hazard. Protect product from flames of any kind; maintain proper clearance when using heat devices, etc. Product can form a flammable vapor/air mixture at temperatures at or above the flash point. Closed container may rupture (due to build up in pressure) when exposed to extreme heat. Product may burn if an ignition source is present. Gives off volatile vapors that are heavier than air and may travel along the ground or may be moved by ventilation and ignited by flame, sparks, heaters, or other ignition sources at distant locations (flashback potential).

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

5.3. Advice for firefighters:

Use water/water spray to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures. Do not flush flammable liquids into sewer as a fire or vapor explosion hazard may result. Never direct a hose stream directly onto a burning flammable/combustible liquid. Solid or straight hose stream will cause fire to spread if directed onto a burning spill or into an open container of burning liquid. Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

See Section 8 for recommendations on the use of personal protective equipment. Eliminate ignition sources. Ventilate areas of spill. Personal Protective Equipment must be worn.

6.2. Environmental precautions:

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

6.3. Methods and material for containment and cleaning up:

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

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

7.2. Conditions for safe storage, including any incompatibilities:

Avoid excessive heat. Do not store near flammable agents. Keep away from heat, sparks and open flames. Store under well-ventilated conditions. Keep container upright, when not in use, to prevent leakage. Avoid storing containers in direct sunlight as vapors may accumulate in the head space creating pressure. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Emptied container may contain residual vapors or liquid which may ignite or explode. Do not reuse empty container without commercial cleaning or reconditioning. Bond and ground all containers when transferring chemical. Comply with all national, state and local codes pertaining to the storage, handling, dispensing and disposal of flammable liquids. 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
Hexanal	N/E	N/E

Chemical Name	UK WEL
Hexanal	N/E

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

Derived No Effect Levels (DNELs):

Hexanal

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	N/E	N/E	N/E	16,46 mg/m3
Workers	Dermal	N/E	N/E	N/E	4,67 mg/kg bw/day
General population	Inhalation	N/E	N/E	N/E	2,9 mg/m3
General population	Dermal	N/E	N/E	N/E	1,67 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	1,67 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

Hexanal

Compartment	PNEC
Freshwater	71,6 µg/L
Freshwater sediment	0,49 mg/kg dw
Marine water	7,16 µg/L
Marine water sediment	0,049 mg/kg dw
Intermittent releases	71,6 µg/L
Soil	0,0558 mg/kg dw
STP	6,7 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. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.).

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses or goggles required.

Hand protection: Avoid skin contact when mixing or handling the material by wearing impervious and chemical resistant gloves. In case of prolonged immersion or frequently repeated contact, gloves with breakthrough times greater than 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: polyethylene/ethylene vinyl alcohol (PE/EVAL). 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. Colorless
Odour:	Characteristic
Odour threshold:	Not Available
pH:	Not Available
Melting point/Freezing point:	-57°C (-71°F) @ 101.3 kPa
Initial boiling point and boiling range °C:	128 °C @ 101.3 kPa
Initial boiling point and boiling range °F:	263 °F @ 101.3 kPa
Flash point:	26-29 °C (79-85 °F) Closed Cup
Evaporation rate:	Not Available
Flammability (solid, gas):	Not Applicable (liquid)

Upper/lower flammability or explosive limits:	LFL/LEL: 1.0% UFL/UEL: 7.5%
Vapour pressure:	2050 Pa @ 20°C
Vapour density:	3.5 (Air=1)
Relative density:	0.808-0.817 (25°C)
Solubility in water:	5.77 g/L @ 20°C
Partition coefficient (n-octanol/water):	2.3 @ 25°C (OECD 117)
Autoignition temperature:	205°C (401°F) @ 1013 hPa
Decomposition temperature:	Not Available
Viscosity:	0.69 mPas @ 20°C
Explosive properties:	Not explosive
Oxidising properties:	Not oxidizing
% Volatile By weight:	Not Available
VOC:	Not Available
Surface tension:	50.11 mN/m @ 20°C (1000 mg/L)

9.2. Other information:

Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

10.1. Reactivity:

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

10.2. Chemical stability:

This product is stable. Normally stable even at elevated temperatures and pressures. Does not undergo explosive decomposition; is shock stable; and is not an oxygen donor.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will not occur. Auto-oxidizes and polymerizes especially in the presence of traces of acid.

10.4. Conditions to avoid:

Do not expose to excessive heat or ignition sources. Exposure to air.

10.5. Incompatible materials:

Avoid strong acids, bases, and oxidizing agents. Avoid contact with reducing agents. Avoid contact with amines. May attack some plastics, rubber and coatings.

10.6. Hazardous decomposition products:

Carbon dioxide, carbon monoxide and hydrocarbons.

SECTION 11: Toxicological information

11.1. Information on toxicological effects:

Information on likely routes of exposure:

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

Eyes: Causes serious eye irritation.

Skin: May be absorbed through the skin. Causes skin irritation.

Inhalation: Inhalation may cause irritation of the respiratory tract and mucous membranes. Chronic exposure may cause headache, dizziness, tiredness, nausea and vomiting.

Ingestion: Ingestion may cause irritation.

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

Chemical Name	Inhalation LC50	Species	Oral LD50	Species	Dermal LD50	Species
Hexanal	LCL0=2000 ppm (4 hours)	Rat/ adult	7703 mg/kg bw	Rat/ adult male	>8100 mg/kg bw	Rabbit/ adult

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

Chemical Name	Skin irritation	Species
Hexanal	Irritant (OECD 431 & 439)	In-Vitro

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

Chemical Name	Eye irritation	Species
Hexanal	Irritant (OECD 438 & 492)	In-Vitro

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

Chemical Name	Skin sensitisation	Species
Hexanal	Non-sensitizer	Weight of evidence

Carcinogenicity: Not classified (no relevant information found).

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). HEXANAL: Mixed results were seen in in-vitro genotoxicity assays. Based on the weight-of-evidence approach, there is some limited indication for genotoxicity of hexanal. However, the chromosome aberration test on hexanal did not induce chromosome aberrations. The results of an in vivo mammalian alkaline comet assay reveal that hexanal did not induce induce statistically significant increases in DNA strand breaks, up to limit concentration of 2000 mg/kg bw/day. Thus, the in vivo study confirms that hexanal does not posses genotoxic acitivity.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). HEXANAL: Reproductive toxicity, oral study in rats: NOAEL (no-observed adverse-effect-level) = 1000 mg/kg bw/day (OECD 422).

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). HEXANAL: Repeated dose study, oral, rat: NOAEL (no-observed-adverse-effect-level) =1000 mg/kg bw/day.

Aspiration hazard: Not classified (no relevant information found).

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

Chemical Name	Species	Acute	Acute	Chronic
Hexanal	Fish	LC50 14 mg/L (96 hours)	N/E	LC50 9.8 mg/L (14 days)
Hexanal	Invertebrates	EC50 7.16 mg/L (48 hours) (geometric mean measured)	N/E	N/E
Hexanal	Algae	EC50 22.6 mg/L (72 hours)	N/E	EC10 19.25 mg/L(72 hours)
Hexanal	Micro-organisms	EC50 / EC10 250 mg/L / 67 mg/L (3 hours)		

12.2. Persistence and degradability:

Chemical Name	Biodegradation
Hexanal	Readily biodegradable (OECD 301F)

12.3. Bioaccumulative potential:

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
Hexanal	13 (calculated)	2.3 @ 25°C (OECD 117)

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
Hexanal	32.359 (20°C)

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: UN1207

14.2. UN proper shipping name:

Hexaldehyde

14.3. Transport hazard class(es):

U.S. DOT hazard class: 3
Canada TDG hazard class: 3
Europe ADR/RID hazard class: 3
IMDG Code (ocean) hazard class: 3
ICAO/IATA (air) hazard class: 3

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: Not Applicable

Hazardous substance (USA): Not Applicable

14.6. Special precautions for user:

Not Applicable

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

Not Applicable

SECTION 15: Regulatory information

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

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

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

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.

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):

H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

Reason for revision: Changes in Section(s): 8

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

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

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

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

Annex

Exposure Scenarios

Substance information:

Name of substance: Hexanal.
EC# 200-624-5 / CAS# 66-25-1
UK REACH Registration number: DUIN Submitted
EU REACH Registration number: 01-2119962890-29-0002

List of exposure scenarios:

ES1: Formulation.
ES2: Use at industrial sites - Use as an intermediate.
ES3: Use at industrial sites - Industrial end-use of washing and cleaning products.
ES4: Use at industrial sites - Metal surface treatment.
ES5: Use by professional workers - Professional end-use of polishes and wax blends.
ES6: Use by professional workers - Professional end-use of washing and cleaning products.
ES7: Use by professional workers - Professional end-use of cosmetics.
ES8: Consumer use - Consumer end-use of washing and cleaning products.
ES9: Consumer use - Consumer end-use of air care products.
ES10: Consumer use - Consumer end-use of biocides.
ES11: Consumer use - Consumer end-use of polishes and wax blends.
ES12: Consumer use - Consumer end-use of cosmetics

General remarks:

The first tier environmental exposure assessments have at first instance been performed using EUSES v2.1.2 which is part of Chemical Safety Assessment and Reporting tool version 3.4 (CHESAR v3.4). 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 or release fractions have been defined according to the A&B-tables in Appendix 1 of the 2003 Technical Guidance Document on Risk Assessment (EU TGD 2003), Part II.

The worker dermal and inhalation exposure assessments for industrial and professional uses have been performed using ECETOC TRA Worker v3 model integrated in the Chemical Safety Assessment and Reporting tool (CHESAR v3.4) or the Advanced REACH tool (ART v1.5) (inhalation exposures).

Consumer exposure assessments have been performed using ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo Web v1.0.5. This substance is categorized in the "low hazard" band according to ECHA Chemical Safety Assessment Guidance Part E Table E.3-1). The following operational conditions (OC) and risk management measures (RMM) are recommended for substances considered to be "low hazard":
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- Good standard of personal hygiene

- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Moreover, the following OCs and RMMs are additionally suggested to ensure that the workplace concentration is of an acceptable limit.
- Ensure the workplace is well ventilated, e.g. a local exhaust ventilation is installed;
- Ensure an occupational health and safety management system is in place;
- Reduce the exposure of workers to emissions from the substance, e.g. by separation of workers and emission source, containment of the emission source;
- Preferably, the neat substance and liquid formulations should be transferred by submerged loading;
- Ensure effective housekeeping practices are in place.

General information on risk management related to physicochemical hazard:
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Keep container tightly closed.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Wear protective gloves/ protective clothing/eye protection/face protection.
- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- Store in a well-ventilated place. Keep cool.

Exposure scenario (1): Formulation

1. Exposure scenario (1)

Short title of the exposure scenario:
Formulation

List of use descriptors:
Product category (PC): PC3, PC8, PC28, PC31, PC35
Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15
Environmental release category (ERC): ERC2 (SpERC AISE 2.1h.v2)

List of names of contributing worker scenarios and corresponding PROCs:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC4 Chemical production where opportunity for exposure arises.
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 2.1h.v2: Formulation of liquid Detergents/Maintenance Products: Low Viscosity (medium scale).

Further explanations:
PC3 Air care products.
PC8 Biocidal products.
PC28 Perfumes, fragrances.
PC31 Polishes and wax blends.
PC35 Washing and cleaning 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:
Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article:
- PROC4, PROC5, PROC8a, PROC9: <=25%
- PROC1, PROC2, PROC3, PROC8b, PROC14, PROC15: <=1%

Physical form of the used product:
- PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15: Liquid.
- PROC14: Solid (non or low dusty form).

Vapour pressure: 7600 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity:
- PROC8b, PROC9: <=1 hour/day.
- PROC2, PROC4, PROC5, PROC8a, PROC14: <=4 hours/day.
- PROC1, PROC3, PROC15: <=8 hours/day.

Other given operational conditions affecting workers exposure:
Location: Indoor use.
Domain: Industrial use.
Process temperature: <= 40 °C.
Assessment tool used:
- PROC1, PROC2, PROC3, PROC8b, PROC9, PROC14, PROC15: ECETOC TRA Worker v3 for inhalation and dermal exposure.
- PROC4, PROC5, PROC8a: ECETOC TRA Worker v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.

Technical conditions and measures at process level (source) to prevent release:
Activity class - subclass (ART v1.5):
- PROC4: Activities with open liquid surfaces and open reservoirs - activities with relatively undisturbed surfaces. Open surface 0.1-0.3 m2. Containment: Low level containment (90% reduction).
- PROC5: Activities with open liquid surfaces and open reservoirs - activities with relatively undisturbed surfaces. Open surface 0.1-0.3 m2. Containment: open process.
- PROC8a: Handling of contaminated objects: Level of contamination: <10% of surface; Activities with treated/contaminated objects (surface 0.3-1 m2). Containment: open process.
Inhalation exposure model (ART v1.5) - covers use in room size of >1000 m3 (PROC4, PROC8a); room size of >300 m3 (PROC5).
Ensure effective housekeeping practices are in place.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1, PROC2, PROC14: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC3, PROC8b, PROC9, PROC15: Enhanced general ventilation (5-10 air changes per hour): 70%.
- PROC4, PROC5, PROC8a: Ventilation rate >10 air changes per hour (ART 1.5).
Local exhaust ventilation: Not required.
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection:
- PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC14, PROC15: Not required.
- PROC5: Yes (Respirator with APF of 20) (Effectiveness Inhalation: 95%).
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection:
- PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14, PROC15: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).
- PROC4: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).
- PROC8a: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (Effectiveness Dermal: 95%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Maximum daily use at a site: 4,5 tons/day.
Maximum annual use at a site: 1130 tons/year.

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

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

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0.0; (final release): 0.0. Local release rate: 0 kg/day (SpERC AISE 2.1h.v2).
Release fraction to wastewater from process (initial release): 0,001; (final release): 0,001. Local release rate: 4,5 kg/day (SpERC AISE 2.1h.v2)
Release fraction to soil from process (final release): 0.0 (SpERC AISE 2.1h.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).

Process efficiency: Process with efficient use of raw materials.
Typical measures reducing emissions to waste water may include may include:
- Closed automated process and/or Closed transfer system and/or Closed batch systems and/or Semi-closed transfer system and/or Batch production of final product;
- Dedicated storage tanks for raw materials, premixes and final products.
Equipment cleaning: Equipment cleaning with minimized emissions to wastewater. Typically implemented measures for reducing emissions to waste water may include: Manual removal of residual products adhering to equipment (e.g. by manual scrubbing, vacuum cleaning, etc.); Use of two-liner systems (i.e. single use disposable reactor cover that is incinerated after use as solid waste).

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.
General good practice: Trained staff, spill protection including waste reuse.

3. Exposure estimation and reference to its source

Assessment method-Health: PROC1, PROC2, PROC3, PROC8b, PROC9, PROC14, PROC15: ECETOC TRA v3. PROC4, PROC5, PROC8a: ECETOC TRA v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure. Only highest figures are presented here.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,987 mg/kg bw/day	0,211	PROC5
Worker, long-term, systemic, Inhalation	12.52 mg/m3	0,761	PROC14
Worker, long-term, systemic, Combined routes	N/A	0,769	PROC14
Worker, long-term, local, Dermal	0,144 mg/cm2	Qualitative risk	PROC5
Worker, short-term, local, Dermal	0,144 mg/cm2	Qualitative risk	PROC5

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,016 mg/L	0,223	
Freshwater sediment	0,109 mg/kg dw	0,223	
Marine water	0,0016 mg/L	0,223	
Marine water sediment	0,011 mg/kg dw	0,223	
Soil	0,015 mg/kg dw	0,277	
STP	0,159 mg/L	0,024	

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. Indoor use, PROC4, PROC8a: LEV used, with gloves. Duration of activity: PROC8b, PROC9: <=1 hour/day. PROC2, PROC4, PROC5, PROC8a, PROC14: <=4 hours/day. PROC1, PROC3, PROC15: <=8 hours/day. Respiratory protection: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC14, PROC15: Not required. PROC5: Yes (Respirator with APF of 20) (Effectiveness Inhalation: 95%). Concentration of substance in mixture/article: PROC4, PROC5, PROC8a, PROC9: <=25%. PROC1, PROC2, PROC3, PROC8b, 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 (2): Use at industrial sites - Use as an intermediate

1. Exposure scenario (2)

Short title of the exposure scenario:
Use at industrial sites - Use as an intermediate

List of use descriptors:
Product category (PC): PC0
Process category (PROC): PROC1, PROC2, PROC3, PROC8b, PROC9, PROC15
Environmental release category (ERC): ERC6a

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.
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:
ERC6a Use of intermediate.

Further explanations:
PC0 Other.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 7600 Pa at 40 °C

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

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

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1, PROC2, PROC3, PROC8b, PROC15: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC9: Good general ventilation (3-5 air changes per hour): 30%.
Local exhaust ventilation:
- PROC1: Not required.
- PROC2, PROC3, PROC9, PROC15: Yes (90% effectiveness).
- PROC8b: Yes (95% effectiveness).
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection: Not required.
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection:
- PROC1, PROC2, PROC3, PROC15: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).
- PROC8b, PROC9: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Maximum daily use at a site: 0,5 ton/day.
Maximum annual use at a site: 10 tons/year.

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

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

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.

Release fraction to air from process (initial release): 0,05; (final release): 0,05. Local release rate: 25 kg/day.
Release fraction to wastewater from process (initial release): 0,02; (final release): 0,02. Local release rate: 10 kg/day.
Release fraction to soil from process (final release): 0,001.

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

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

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

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,137 mg/kg bw/day	0,029	PROC8b
Worker, long-term, systemic, Inhalation	0,876 mg/m3	0,053	PROC9
Worker, long-term, systemic, Combined routes	N/A	0,062	PROC9
Worker, long-term, local, Dermal	0,01 mg/cm2	Qualitative risk	PROC8b
Worker, short-term, local, Dermal	0,01 mg/cm2	Qualitative risk	PROC8b

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,035 mg/L	0,494	
Freshwater sediment	0,242 mg/kg dw	0,493	
Marine water	0,00353 mg/L	0,494	
Marine water sediment	0,024 mg/kg dw	0,493	
Soil	0,034 mg/kg dw	0,617	
STP	0,352 mg/L	0,053	

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. Indoor use, LEV used, with gloves, no respirator required. Duration of activity: PROC9: <=4 hours/day. PROC1, PROC2, PROC3, PROC8b, PROC15: <=8 hours/day. Concentration of substance in mixture/article: <=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 (3): Use at industrial sites - Industrial end-use of washing and cleaning products

1. Exposure scenario (3)

Short title of the exposure scenario:
Use at industrial sites - Industrial end-use of washing and cleaning products

List of use descriptors:
Sector of use category (SU): SU0
Product category (PC): PC8, PC35
Process category (PROC): PROC1, PROC2, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC28
Environmental release category (ERC): ERC4 (SpERC AISE 4.1.v2)

List of names of contributing worker scenarios and corresponding PROCs:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC4 Chemical production where opportunity for exposure arises.
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.
PROC28 Manual maintenance (cleaning and repair) of machinery.

Name of contributing environmental scenario and corresponding ERCs:
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article).
SpERC AISE 4.1.v2: Industrial Use of Water Borne Processing Aids.

Further explanations:
PC8 Biocidal products.
PC35 Washing and cleaning 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:
Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 7600 Pa at 40 °C

Amounts used:
Application rate (for inhalation exposure): Unless otherwise stated, not specified.
- PROC7 (outdoors): moderate application rate (0.3-3 L/minute).

Frequency and duration of use/exposure:
Duration of activity:
- PROC1, PROC2, PROC4, PROC7 (indoors), PROC8b, PROC10, PROC13: <=8 hours/day.
- PROC8a (outdoors): <=4 hours/day.
- PROC7 (outdoors), PROC8a (indoors), PROC28: <=1 hour/day.

Other given operational conditions affecting workers exposure:
Location:
- PROC1, PROC2, PROC8b, PROC13, PROC28: Indoor use.
- PROC4, PROC7, PROC8a, PROC10: Indoor/outdoor use.
Domain: Industrial use.
Process temperature: <= 40 °C.
Assessment tool used:
- PROC1, PROC2, PROC4, PROC7 (indoors), PROC8a, PROC8b, PROC10 (indoors), PROC13, PROC28: ECETOC TRA Worker v3 for inhalation and dermal exposure.
- PROC7 (outdoors), PROC10 (outdoors): ECETOC TRA Worker v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.

Technical conditions and measures at process level (source) to prevent release:
Activity class - subclass (ART v1.5):
- PROC7 (outdoors): Spray application of liquids - surface spraying of liquids. Spray technique: Spraying with no or low compressed air use. Spray direction: Spraying in any direction (including upwards). Located in breathing zone of the worker.
- PROC10 (outdoors): Spreading of liquid products. Spreading of liquids at surfaces or work pieces: 0,3-1 m2/hour. Located in breathing zone of the worker.
Ensure effective housekeeping practices are in place.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1, PROC2, PROC4 (indoors), PROC7 (indoors), PROC8a (indoors), PROC8b, PROC28: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC10 (indoors), PROC13: Enhanced general ventilation (5-10 air changes per hour): 70%.
- PROC4 (outdoors), PROC7 (outdoors), PROC8a (outdoors), PROC10 (outdoors): Outdoors (outdoor use).
Local exhaust ventilation: Unless otherwise stated, Not required.
- PROC7 (indoors): Yes (95% effectiveness).
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection: Not required.
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Maximum daily use at a site: 0,013 ton/day.
Maximum annual use at a site: 2,75 tons/year.

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

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

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (SpERC AISE 4.1.v2).
Release fraction to wastewater from process (initial release): 1.0; (final release): 1.0. Local release rate: 12,5 kg/day (SpERC AISE 4.1.v2)
Release fraction to soil from process (final release): 0,0 (SpERC AISE 4.1.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).
Process efficiency: Optimized water use due to e.g.: Re-use of rinsing water.
Chemical waste - discontinuous and continuous generation: Spent fluid discharged to wastewater.

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: PROC1, PROC2, PROC4, PROC7 (indoors), PROC8a, PROC8b, PROC10 (indoors), PROC13, PROC28: ECETOC TRA v3. PROC7 (outdoors), PROC10 (outdoors): ECETOC TRA v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure. Only highest figures are presented here.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,857 mg/kg bw/day	0,184	PROC7 (indoors)
Worker, long-term, systemic, Inhalation	12,52 mg/m3	0,761	PROC28
Worker, long-term, systemic, Combined routes	N/A	0,796	PROC28
Worker, long-term, local, Dermal	0,04 mg/cm2	Qualitative risk	PROC7 (indoors), PROC10, PROC13
Worker, short-term, local, Dermal	0,04 mg/cm2	Qualitative risk	PROC7 (indoors), PROC10, PROC13

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,044 mg/L	0,617	
Freshwater sediment	0,302 mg/kg dw	0,616	
Marine water	0,00442 mg/L	0,617	
Marine water sediment	0,03 mg/kg dw	0,616	
Soil	0,043 mg/kg dw	0,77	
STP	0,441 mg/L	0,066	

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. Indoor/outdoor use, PROC7 (indoors): LEV used, with gloves, no respirator required. Duration of activity: PROC1, PROC2, PROC4, PROC7 (indoors), PROC8b, PROC10, PROC13: <=8 hours/day. PROC8a (outdoors): <=4 hours/day. PROC7 (outdoors), PROC8a (indoors), PROC28: <=1 hour/day. Concentration of substance in mixture/article: <=1%.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (4): Use at industrial sites - Metal surface treatment

1. Exposure scenario (4)

Short title of the exposure scenario:
Use at industrial sites - Metal surface treatment

List of use descriptors:
Sector of use category (SU): SU17
Product category (PC): PC14
Process category (PROC): PROC7, PROC8b, PROC10, PROC13, PROC21.
Environmental release category (ERC): ERC5 (SpERC AISE 5.1b.v2)

List of names of contributing worker scenarios and corresponding PROCs:
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.
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.
PROC21 Low energy manipulation and handling of substances bound in/on materials or articles. Cover activities such as manual cutting, cold rolling or assembly/disassembly of material/article.

Name of contributing environmental scenario and corresponding ERCs:
ERC5 Use at industrial site leading to inclusion into/onto article.
SpERC AISE 5.1b.v2: Industrial use of Me-salts in Conversion Coating – Zinc, Chromium, Copper, Manganese.

Further explanations:
PC14 Metal surface treatment 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:
Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product:
- PROC7, PROC8b, PROC10, PROC13: Liquid.
- PROC21: Solid (non or low dusty form).
Vapour pressure: 7600 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity: <=8 hours/day.

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

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation: Basic general ventilation (1-3 air changes per hour): 0%.
Local exhaust ventilation:
- PROC8b, PROC21: Not required.
- PROC10, PROC13: Yes (90% effectiveness).
- PROC7: Yes (95% effectiveness).
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection: Not required.
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.

Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Maximum daily use at a site: 0,05 ton/day.
Maximum annual use at a site: 11 tons/year.

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

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

Other given operational conditions affecting environmental exposure:
Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (SpERC AISE 5.1b.v2).
Release fraction to wastewater from process (initial release): 0,01; (final release): 0,01. Local release rate: 0,5 kg/day (SpERC AISE 5.1b.v2)
Release fraction to soil from process (final release): 0,0 (SpERC AISE 5.1b.v2).
Type of process: Substance applied in aqueous process solution with negligible volatilization.

Technical conditions and measures at process level (source) to prevent release:
Chemical waste - Continuous generation: Spent fluid discharged to wastewater; Discontinuous generation: Spent fluid to be disposed of as chemical waste.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:
Dry sludge application to agricultural soil: Yes (default).
Process efficiency: Optimized water use due to e.g.: Re-use of rinsing water.

Conditions and measures related to municipal sewage treatment plant:
Municipal Sewage Treatment Plant (STP): Yes (Efficiency=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

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

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,857 mg/kg bw/day	0,184	PROC7
Worker, long-term, systemic, Inhalation	10,43 mg/m3	0,634	PROC8b
Worker, long-term, systemic, Combined routes	N/A	0,693	PROC8b
Worker, long-term, local, Dermal	0,04 mg/cm2	Qualitative risk	PROC7, PROC10, PROC13
Worker, short-term, local, Dermal	0,04 mg/cm2	Qualitative risk	PROC7, PROC10, PROC13

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,00188 mg/L	0,026	
Freshwater sediment	0,013 mg/kg dw	0,026	
Marine water	0,000186 mg/L	0,026	
Marine water sediment	0,00127 mg/kg dw	0,026	
Soil	0,00172 mg/kg dw	0,031	
STP	0,018 mg/L	<0,01	

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

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

Health: Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC7, PROC10, PROC13: LEV used, with gloves, no respirator required. Duration of activity: <=8 hours/day. Concentration of substance in mixture/article: <=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 (5): Use by professional workers - Professional end-use of polishes and wax blends

1. Exposure scenario (5)

Short title of the exposure scenario:
Use by professional workers - Professional end-use of polishes and wax blends

List of use descriptors:
Sector of use category (SU): SU0

Product category (PC): PC31
Process category (PROC): PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19
Environmental release category (ERC): ERC8a

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

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

Further explanations:
PC31 Polishes and wax blends.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 7600 Pa at 40 °C

Amounts used:
Application rate (for inhalation exposure): Unless otherwise stated, not specified.
- PROC11: very low application rate (<0,03 L/minute).

Frequency and duration of use/exposure:
Duration of activity:
- PROC1, PROC2, PROC10, PROC13: <=8 hours/day.
- PROC4, PROC8b: <=4 hours/day.
- PROC8a, PROC19: <=1 hour/day.
- PROC11: <=15 minutes/day.

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

Technical conditions and measures at process level (source) to prevent release:
Activity class - subclass (ART v1.5):
- PROC10: Spreading of liquid products. Spreading of liquids at surfaces or work pieces: 0,3-1 m2/hour.
- PROC11: Spray application of liquids - surface spraying of liquids. Spray technique: Spraying with no or low compressed air use. Spray direction: Only horizontal or downward spraying. Located in breathing zone of the worker.
- PROC13: Activities with open liquid surfaces and open reservoirs - activities with relatively undisturbed surfaces. Open surface 0.1-0.3 m2.
Inhalation exposure model (ART v1.5) - covers use in room size of >1000 m3 (PROC10); room size of >30 m3 (PROC11); room size of >100 m3 (PROC13).
Ensure effective housekeeping practices are in place.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC19: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC10, PROC11, PROC13: Ventilation rate >3 air changes per hour (ART 1.5).
Local exhaust ventilation: Not required.
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Basic.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection: Not required.
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection:
- PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13, PROC19: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).

- PROC10: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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 use.
Professional use.
Release fraction to air from process (initial release): 1,00; (final release): 1,00.
Release fraction to wastewater from process (initial release): 1,00; (final release): 1,00. Local release rate: 0,055 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

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

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,566 mg/kg bw/day	0,121	PROC19
Worker, long-term, systemic, Inhalation	12,52 mg/m3	0,761	PROC4, PROC8b
Consumer, long-term, systemic, Combined routes	N/A	0,796	PROC8b
Worker, long-term, local, Dermal	0,04 mg/cm2	Qualitative risk	PROC13
Worker, short-term, local, Dermal	0,04 mg/cm2	Qualitative risk	PROC13

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, without LEV, with gloves, no respirator required. Duration of activity: PROC1, PROC2, PROC10, PROC13: <=8 hours/day. PROC4, PROC8b: <=4 hours/day. PROC8a, PROC19: <=1 hour/day. PROC11: <=15 minutes/day. Concentration of substance in mixture/article: <=1%.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (6): Use by professional workers - Professional end-use of washing and cleaning products

1. Exposure scenario (6)

Short title of the exposure scenario:
Use by professional workers - Professional end-use of washing and cleaning products

List of use descriptors:
Sector of use category (SU): SU0
Product category (PC): PC8, PC35
Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19
Environmental release category (ERC): ERC8a

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.
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).

Further explanations:
PC8 Biocidal products.
PC35 Washing and cleaning products.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:
Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 7600 Pa at 40 °C

Amounts used:
Application rate (for inhalation exposure): Unless otherwise stated, not specified.
- PROC11 (indoors): very low application rate (<0,03 L/minute).

Frequency and duration of use/exposure:
Duration of activity:
- PROC1, PROC2, PROC3, PROC4, PROC10: <=8 hours/day.
- PROC8b, PROC11 (outdoors), PROC13: <=4 hours/day.
- PROC8a, PROC19: <=1 hour/day.
- PROC11 (indoors): <=15 minutes/day.

Other given operational conditions affecting workers exposure:
Location:
- PROC1, PROC2, PROC3, PROC4, PROC8b, PROC13, PROC19: Indoor use.
- PROC8a, PROC10, PROC11: Indoor/outdoor use.
Domain: Professional use.
Process temperature: <= 40 °C.
Assessment tool used:
- PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC11 (outdoors), PROC13, PROC19: ECETOC TRA Worker v3 for inhalation and dermal exposure.

- PROC10, PROC11 (indoors): ECETOC TRA Worker v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.

Technical conditions and measures at process level (source) to prevent release:
Activity class - subclass (ART v1.5):
- PROC10: Spreading of liquid products. Spreading of liquids at surfaces or work pieces: 0,3-1 m2/hour.
- PROC11 (indoors): Spray application of liquids - surface spraying of liquids. Spray technique: Spraying with no or low compressed air use. Spray direction: Only horizontal or downward spraying. Located in breathing zone of the worker.
Inhalation exposure model (ART v1.5) - covers use in room size of >1000 m3 (PROC10 (indoors)); room size of >30 m3 (PROC11 (indoors)).
Ensure effective housekeeping practices are in place.

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC1, PROC2, PROC3, PROC8a (indoors), PROC8b, PROC19: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC4, PROC13: Enhanced general ventilation (5-10 air changes per hour): 70%.
- PROC10 (indoors), PROC11 (indoors): Ventilation rate >3 air changes per hour (ART 1.5).
- PROC8a (outdoors), PROC10 (outdoors), PROC11 (outdoors): Outdoors (outdoor use).
Local exhaust ventilation: Not required.
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Basic.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection:
- PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11 (indoors), PROC13, PROC19: Not required.
- PROC11 (outdoors): Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%).
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection:
- PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC11 (indoors), PROC13, PROC19: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).
- PROC10, PROC11 (outdoors): Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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 use.
Professional use.
Release fraction to air from process (initial release): 1,00; (final release): 1,00.
Release fraction to wastewater from process (initial release): 1,00; (final release): 1,00. Local release rate: 0,055 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC11 (outdoors), PROC13, PROC19: ECETOC TRA

v3. PROC10, PROC11 (indoors): ECETOC TRA v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure. Only highest figures are presented here.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,643 mg/kg bw/day	0,138	PROC11 (outdoors)
Worker, long-term, systemic, Inhalation	12,52 mg/m3	0,761	PROC8b
Worker, long-term, systemic, Combined routes	N/A	0,796	PROC8b
Worker, long-term, local, Dermal	0,03 mg/cm2	Qualitative risk	PROC11 (outdoors)
Worker, short-term, local, Dermal	0,03 mg/cm2	Qualitative risk	PROC11 (outdoors)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

Health: Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor/outdoor use, without LEV, with gloves. Duration of activity: PROC1, PROC2, PROC3, PROC4, PROC10: <=8 hours/day. PROC8b, PROC11 (outdoors), PROC13: <=4 hours/day. PROC8a, PROC19: <=1 hour/day. PROC11 (indoors): <=15 minutes/day. Respiratory protection: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11 (indoors), PROC13, PROC19: Not required. PROC11 (outdoors): Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). Concentration of substance in mixture/article: <=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 (7): Use by professional workers - Professional end-use of cosmetics

1. Exposure scenario (7)

Short title of the exposure scenario:
Use by professional workers - Professional end-use of cosmetics

List of use descriptors:
Sector of use category (SU): SU0
Product category (PC): PC28, PC39
Process category (PROC): PROC5, PROC8a.
Environmental release category (ERC): ERC8a

List of names of contributing worker scenarios and corresponding PROCs:
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.

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:
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).

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. The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Vapour pressure: 7600 Pa at 40 °C

Frequency and duration of use/exposure:
Duration of activity: <=1 hour/day.

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

Technical conditions and measures to control dispersion from source towards the worker:
General ventilation:
- PROC5: Basic general ventilation (1-3 air changes per hour): 0%.
- PROC8a: Good general ventilation (3-5 air changes per hour): 30%.
Local exhaust ventilation: Not required.
Local exhaust ventilation (for dermal): Not required.
Occupational Health and Safety Management System: Basic.

Conditions and measures related to personal protection, hygiene and health evaluation:
Respiratory protection: Not required.
Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).
Dermal protection: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).

Additional good practice advice:
Generally accepted standards of occupational hygiene are maintained.
- Minimisation of manual phases/work tasks;
- Work procedures minimising splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs are followed;
- Training for staff on good practice
- The following personal protective equipment is recommended: chemical goggles, face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier materials.
- Use Local Exhaust ventilation.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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.
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: 0,055 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

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

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Worker, long-term, systemic, Dermal	0,055 mg/kg bw/day	0,012	PROC5, PROC8a
Worker, long-term, systemic, Inhalation	8,347 mg/m	0,507	PROC5
Worker, long-term, systemic, Combined routes	N/A	0,519	PROC5
Worker, long-term, local, Dermal	0,008 mg/cm2	Qualitative risk	PROC5
Worker, short-term, local, Dermal	0,008 mg/cm2	Qualitative risk	PROC5

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

Health: Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, without LEV, with gloves, no respirator required. Duration of activity: <=1 hour/day. Concentration of substance in mixture/article: <=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 (8): Consumer use - Consumer end-use of washing and cleaning products

1. Exposure scenario (8)

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

List of use descriptors:
Product category (PC): PC35
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:
PC35 Washing and cleaning products.
- CS1: All purpose cleaners (liquid).
- CS2: Bathroom cleaning liquid.
- CS3: Dishwashing liquid.
- CS4: Floor cleaning liquid.

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

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Exposure via inhalation route: Yes.
Exposure via dermal route: Yes.
Oral contact foreseen: No.
Average molecular weight of the matrix (product minus the compound of interest): 18 g/mol.
Mass transfer coefficient: 10 m/hour.

Amounts used:
Applied amounts for each use event:
- CS1: <=16,66 g
- CS2: <=4,803 g.
- CS3: <=7,143 g.
- CS4: <=14.51 g.

Product amount in contact with skin:
- CS1: <=0,286 g/event.
- CS2: <=0,3 g/event.
- CS3: <=0,031 g/event.
- CS4: <=0,36 g/event.

Frequency and duration of use/exposure:
Duration covers exposure up to:
- CS1, CS4: <=20 minutes/event (dermal); <=240 minutes/event (inhalation).
- CS2: <=20 minutes/event (dermal); <=25 minutes/event (inhalation).
- CS3: <=16 minutes/event (dermal); <=45 minutes/event (inhalation).

Frequency: covers use frequency:
- CS1: up to 1 time/day; frequent use per year (197 times/year).
- CS2: up to 1 time/day; frequent use per year (156 times/year).
- CS3: up to 1,2 times/day; frequent use per year (426 times/year).
- CS4: up to 1 time/day; frequent use per year (161 times/year).

Human factors not influenced by risk management:
Exposed skin surface: <=2200 cm2.

Other given operational conditions affecting consumers exposure:
Location: Indoor use.
Application temperature: CS3: 45°C.
Body weight: 65 kg.
Inhalation exposure model: CS1, CS4 - Covers use in room size of >=58 m3; CS2 - Covers use in room size of >=10 m3; CS3 - Covers use in room size of >=15 m3.
Inhalation exposure model - Release area: CS1: <= 32 m2; CS2: <=9 m2; CS3: <= 0.15 m2; CS4: <=22 m2.

Conditions and measures related to information and behavioral advice to consumers:
Assessment tool used: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Conditions and measures related to personal protection and hygiene:
General ventilation: ventilation rate:
- CS1, CS4: >= 0,5 air changes/ hour.
- CS2: >= 2 air changes/ hour.
- CS3: >= 2,5 air changes/ hour.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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): 1,00; (final release): 1,00.
Release fraction to wastewater from process (initial release): 1,00; (final release): 1,00. Local release rate: 0,055 kg/day.
Release fraction to soil from process (final release):
- ERC8a: 0,00.
- ERC8d: 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5. Only highest figures are presented here.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,055 mg/kg bw/day	0,033	PC35 (CS4)
Consumer, long-term, systemic, Inhalation	0,74 mg/m3	0,255	PC35 (CS1)
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	PC35
Consumer, long-term, systemic, Combined routes	N/A	0,285	PC35 (CS4)
Consumer, long-term, local, Dermal	0,0016 mg/cm2	Qualitative risk	PC35 (CS4)
Consumer, short-term, local, Dermal	0,0016 mg/cm2	Qualitative risk	PC35 (CS4)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

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

Exposure scenario (9): Consumer use - Consumer end-use of air care products

1. Exposure scenario (9)

Short title of the exposure scenario:
Consumer use - Consumer end-use of air care products

List of use descriptors:
Product category (PC): PC3
Environmental release category (ERC): ERC8a

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

Further explanations:
PC3 Air care products - Air space sprays.

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

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Exposure via inhalation route: Yes.
Exposure via dermal route: Yes.
Oral contact foreseen: No.
Spray: Yes.
Airborne fraction: 0,3.

Amounts used:
Applied amounts for each use event: Inhalation mass generation rate <= 1,1 g/sec for spray duration <= 0,33 minutes; Dermal contact rate <= 269 mg/min for <= 0,33 minutes.

Frequency and duration of use/exposure:
Duration covers exposure up to: <=0,33 minutes/event (dermal); <=240 minutes/event (inhalation).
Frequency - covers use frequency: up to 1 time/day; frequent use per year (90 times/year).

Human factors not influenced by risk management:
Exposed skin surface: <=900 cm2.

Other given operational conditions affecting consumers exposure:
Location: Indoor use.
Body weight: 65 kg.
Inhalation exposure model: Covers use in room size of >=58 m3.

Conditions and measures related to information and behavioral advice to consumers:
Assessment tool used: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Conditions and measures related to personal protection and hygiene:
General ventilation: ventilation rate: >= 0,5 air changes/ hour.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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 use.
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: 0,055 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,014 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Inhalation	0,025 mg/m3	<0,01	
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Combined routes	N/A	0,017	
Consumer, long-term, local, Dermal	0,00099 mg/cm2	Qualitative risk	
Consumer, short-term, local, Dermal	0,00099 mg/cm2	Qualitative risk	

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

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

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

Exposure scenario (10): Consumer use - Consumer end-use of biocides

1. Exposure scenario (10)

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:
PC8 Biocidal products - Disinfectants.

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

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Exposure via inhalation route: Yes.
Exposure via dermal route: Yes.
Oral contact foreseen: No.
Spray: Yes.
Airborne fraction: 0,008.

Amounts used:
Applied amounts for each use event: Inhalation mass generation rate <= 0,8 g/sec for spray duration <= 0,51 minutes; Dermal contact rate <= 46 mg/min for <= 0,51 minutes.

Frequency and duration of use/exposure:

Duration covers exposure up to: <=0,51 minutes/event (dermal); <=60 minutes/event (inhalation).
Frequency - covers use frequency: up to 1 time/day; frequent use per year (365 times/year).

Human factors not influenced by risk management:
Exposed skin surface: <=900 cm2.

Other given operational conditions affecting consumers exposure:
Location: Indoor use.
Body weight: 65 kg.
Inhalation exposure model: Covers use in room size of >=15 m3.

Conditions and measures related to information and behavioral advice to consumers:
Assessment tool used: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Conditions and measures related to personal protection and hygiene:
General ventilation: ventilation rate: >= 2,5 air changes/ hour.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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): 1,00; (final release): 1,00.
Release fraction to wastewater from process (initial release): 1,00; (final release): 1,00. Local release rate: 0,055 kg/day.
Release fraction to soil from process (final release):
- ERC8a: 0,00.
- ERC8d: 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,0036 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Inhalation	0,021 mg/m3	<0,01	
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Combined routes	N/A	<0,01	
Consumer, long-term, local, Dermal	0,00026 mg/cm2	Qualitative risk	
Consumer, short-term, local, Dermal	0,00026 mg/cm2	Qualitative risk	

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000296 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

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

Exposure scenario (11): Consumer use - Consumer end-use of polishes and wax blends

1. Exposure scenario (11)

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

List of use descriptors:
Product category (PC): PC31
Environmental release category (ERC): ERC8a

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

Further explanations:
PC31 Polishes and wax blends - Floor polish.

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

Product characteristics:
Concentration of substance in mixture/article: <=0,5%.
Exposure via inhalation route: Yes.
Exposure via dermal route: Yes.
Oral contact foreseen: No.
Spray: Yes.

Amounts used:
Applied amounts for each use event: <= 53g. Dermal contact rate <= 46 mg/min for <= 1,1 minutes.

Frequency and duration of use/exposure:
Duration covers exposure up to: <=1,1 minutes/event (dermal); <=90 minutes/event (inhalation).
Frequency - covers use frequency: up to 1 time/day; frequent use per year (52 times/year).

Human factors not influenced by risk management:
Exposed skin surface: <=2200 cm2.

Other given operational conditions affecting consumers exposure:
Location: Indoor use.
Body weight: 65 kg.
Inhalation exposure model: Covers use in room size of >=58 m3.

Conditions and measures related to information and behavioral advice to consumers:
Assessment tool used: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Conditions and measures related to personal protection and hygiene:
General ventilation: ventilation rate: >= 0,5 air changes/ hour.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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: >=18000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
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: 0,055 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,0039 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Inhalation	1,27 mg/m3	0,438	
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Combined routes	N/A	0,44	
Consumer, long-term, local, Dermal	0,00012 mg/cm2	Qualitative risk	
Consumer, short-term, local, Dermal	0,00012 mg/cm2	Qualitative risk	

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

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

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

Exposure scenario (12): Consumer use - Consumer end-use of cosmetics

1. Exposure scenario (12)

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

List of use descriptors:
Product category (PC): PC28, PC39
Environmental release category (ERC): ERC8a

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

Further explanations:
PC28: Perfumes, fragrances - CS1: Eau de toilette.
PC39: Cosmetics, personal care products - CS2: Nail polish.

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

Product characteristics:
Concentration of substance in mixture/article: <=1%.
Physical form of the used product: Liquid.
Exposure via inhalation route: Yes.
Exposure via dermal route: Yes.
Oral contact foreseen: No.
Spray: CS1: Yes. CS2: No.
Average molecular weight of the matrix (product minus the compound of interest): CS2: 124 g/mol.
Mass transfer coefficient: CS2: 10 m/hour.
Airborne fraction: CS1: 0,02.

Amounts used:
Applied amounts for each use event:
- CS1: Inhalation mass generation rate <= 0,1 g/sec for spray duration <= 0,08 minutes.
- CS2: 0.25 g.

Product amount in contact with skin:
- CS1: <=0,61 g/event.
- CS2: <=0,05 g/event.

Frequency and duration of use/exposure:
Duration covers exposure up to: <=5 minutes/event.
Frequency: covers use frequency:
- CS1: up to 3 times/day; frequent use per year (1100 times/year).
- CS2: up to 1 time/day; frequent use per year (156 times/year).

Human factors not influenced by risk management:
Exposed skin surface:
- CS1: <= 200 cm2.
- CS2: <= 4 cm2.
Inhalation factor = 1.
Dermal transfer factor = 1.

Other given operational conditions affecting consumers exposure:
Location: Indoor use.
Body weight: 65 kg.
Inhalation exposure model: CS1 - Covers use in room size of >=10 m3; CS2 - Covers use in room size of >=1 m3.
Inhalation exposure model - Release area: CS1: <= 0,0625 m2 (cloud volume); CS2: <=0,0019 m2.

Conditions and measures related to information and behavioral advice to consumers:
Assessment tool used: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5.

Conditions and measures related to personal protection and hygiene:
General ventilation: ventilation rate:
- CS1: >= 2 air changes/ hour.
- CS2: >= 1 air changes/ hour.

2.2 Control of environmental exposure

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

Product characteristics:
Physical state: liquid.
Vapour pressure: 2050 Pa at 20 °C

Amounts used:
Daily wide dispersive use: 0,000055 tons/day.

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: >=18000 m3/day (default).

Other given operational conditions affecting environmental exposure:
Indoor use.
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: 0,055 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=92,95%).
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:
All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: ECETOC TRA v3.1 (R15) model (consumer module) and ConsExpo web v1.0.5. Only highest figures are presented here.

Assessment method-Environment: CHESAR v3.4 - EUSES v2.1.2.

Health

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Consumer, long-term, systemic, Dermal	0,28 mg/kg bw/day	0,168	PC28 (CS1)
Consumer, long-term, systemic, Inhalation	0,65 mg/m3	0,224	PC39 (CS2)
Consumer, long-term, systemic, Oral	0 mg/kg bw/day	<0,01	
Consumer, long-term, systemic, Combined routes	N/A	0,229	PC39 (CS2)
Consumer, long-term, local, Dermal	0,12 mg/cm2	Qualitative risk	PC39 (CS2)
Consumer, short-term, local, Dermal	0,12 mg/cm2	Qualitative risk	PC39 (CS2)

Environment

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater	0,000314 mg/L	<0,01	

Effect/Compartment	Exposure estimate/PEC	RCR	Notes
Freshwater sediment	0,00215 mg/kg dw	<0,01	
Marine water	0,0000293 mg/L	<0,01	
Marine water sediment	0,000201 mg/kg dw	<0,01	
Soil	0,00019 mg/kg dw	<0,01	
STP	0,00194 mg/L	<0,01	

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

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

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