Emerald Performance Materials®
Kalama Chemical

Safety Data Sheet

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

Revision date: 2020-10-07
Supercedes: 2019-02-14

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

1.1. Product identifier:

Product trade name:	Purox* S grains, pure grade sodium benzoate
Company product number:	SBPURS
REACH registration number:	01-2119460683-35-0000
Substance name:	Sodium benzoate
Substance identification number:	EC 208-534-8
Other means of identification:	Sodium benzoic acid; Benzoic acid sodium salt

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

Uses:	Additive. Auxiliary in polymerization processes. Industrial applications. Food and pharmaceutical applications. See Annex for covered uses.
Uses advised against:	This product is not authorized for uses within the scope of the Biocidal Products Regulation (BPR, Regulation (EU) 528/2012).

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

Manufacturer/Supplier:	Emerald Kalama Chemical B.V. Havennr. 4322 - Montrealweg 15 3197 KH Rotterdam-Botlek - THE NETHERLANDS Telephone: +31 88 888 0512/-0509 purox.info@emeraldmaterials.com
For further information about this SDS:	Email: product.compliance@emeraldmaterials.com

1.4. Emergency telephone number:

ChemTel (24 hours): 1-800-255-3924 (USA); +1-813-248-0585 (outside USA).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

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

Eye Irritation, category 2, H319

2.2. Label elements:

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

Hazard pictogram(s):

Signal word:
Warning

Hazard statements:
H319 Causes serious eye irritation.

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

Supplemental information: No Additional Information

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

2.3. Other hazards:

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

Other hazards: May form explosible dust-air mixture if dispersed.

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

3.1. Substance:

CAS-No.	Chemical Name	Weight%	Classification	H Statements
0000532-32-1	Sodium benzoate	99-100	Eye Irrit. 2	H319
CAS-No.	**Chemical Name**	**Weight%**	**REACH Registration No.**	**EC/List Number**
0000532-32-1	Sodium benzoate	99-100	01-2119460683-35-0000	208-534-8

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

Notes: Sodium benzoate: 100%.

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

SECTION 4: First aid measures

4.1. Description of first aid measures:

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

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

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

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

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

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

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

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

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media:

Suitable: Use water spray, dry chemical, or foam. Carbon dioxide may be ineffective on larger fires due to a lack of cooling capacity which may result in reignition.

Unsuitable: Avoid hose streams or any method which will create dust clouds.

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Concentrated dust/air combinations may produce explosive conditions. As with all organic

dusts, fine particles suspended in air in critical proportions and in the presence of an ignition source may ignite and/or explode. Dust may be sensitive to ignition by electrostatic discharge, electrical arcs, sparks, welding torches, cigarettes, open flame, or other significant heat sources. As a precaution, implement standard safety measures for handling finely divided organic powders. See Section 7 for suggested measures.

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:

Water spray (fog) can be used to absorb heat and to cool and protect surrounding exposed material. Avoid hose streams or any method which will create dust clouds. Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

See Section 8 for recommendations on the use of personal protective equipment. If spilled in an enclosed area, ventilate. Avoid raising powdered material due to explosion hazard. Use spark-proof and explosion-proof equipment. If inhalation of dust cannot be avoided, wear an approved particulate respirator. Personal Protective Equipment must be worn.

6.2. Environmental precautions:

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

6.3. Methods and material for containment and cleaning up:

Contain spill. Wear proper personal protective clothing and equipment. Using care to avoid dust generation, vacuum or sweep into a closed container for reuse or disposal. Use approved industrial vacuum cleaner for removal. Avoid causing dust. 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. 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 drinking, tasting, swallowing or ingesting this product. Avoid routine inhalation of dust of any kind. Exercise care when emptying containers, sweeping, mixing or doing other tasks which can create dust. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area. As a precaution to control dust explosion potential, implement the following safety measures:Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). In general, dust of organic materials is a static charge generator which may be ignited by electrostatic discharge, electrical arcs, sparks, welding torches, cigarettes, open flame, or other significant heat sources. Use spark-proof tools and equipment. Bond, ground and properly vent conveyors, dust control devices and other transfer equipment. Prohibit flow of polymer, powder or dust through non-conductive ducts, vacuum hoses or pipes, etc.; only use grounded, electrically conductive transfer lines when pneumatically conveying product. Good housekeeping and controlling of dusts are necessary for safe handling of product. Prevent accumulation of dust (e.g., well-ventilated conditions, promptly vacuuming spills, cleaning overhead horizontal surfaces, etc.).

7.2. Conditions for safe storage, including any incompatibilities:

Store cool and dry, under well-ventilated conditions. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Do not reuse empty container without commercial cleaning or reconditioning. Product will absorb water vapor (hygroscopic).

7.3. Specific end use(s):

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

SECTION 8: Exposure controls / personal protection

8.1. Control parameters:

Occupational exposure limits (OEL):

Chemical Name	EU OELV	EU IOELV	ACGIH - TWA/Ceiling	ACGIH - STEL
Sodium benzoate	N/E	N/E	N/E	N/E

Chemical Name	UK WEL	Ireland OEL
Sodium benzoate	N/E	N/E

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

Derived No Effect Levels (DNELs):

Sodium benzoate

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	N/E	N/E	0,1 mg/m3	3 mg/m3
Workers	Dermal	N/E	N/E	N/E	62,5 mg/kg bw/day
General population	Inhalation	N/E	N/E	0,06 mg/m3	1,5 mg/m3
General population	Dermal	N/E	N/E	N/E	31,25 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	16,6 mg/kg bw/day
Humans via the environment	Inhalation	N/E	N/E	N/E	1,5 mg/m3
Humans via the environment	Oral	N/E	N/E	N/E	16,6 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

Sodium benzoate

Compartment	PNEC
Freshwater	0,13 mg/L
Freshwater sediment	1,76 mg/kg dw
Marine water	0,013 mg/L
Marine water sediment	0,176 mg/kg dw
Intermittent releases	305 ug/L
Soil	0,06 mg/kg dw
STP	10 mg/L
Oral	300 mg/kg food

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

8.2. Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation (minimum 5 air changes per hour) to draw dust 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.). Prohibit flow of powder or dust through non-conductive ducts, vacuum hoses, or pipes, etc. Bond, ground, and properly vent conveyors, dust control devices and other transfer equipment.

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses or goggles required.

Hand protection: Avoid skin contact when mixing or handling the material by wearing impervious and chemical resistant gloves. In case of prolonged immersion or frequently repeated contact, gloves with breakthrough times greater than 240 minutes (protection class 5 or greater) are recommended. For brief contact or splash applications, gloves with breakthrough times of 10 minutes or greater are recommended (protection class 1 or greater). Suggested materials for protective gloves: Butyl rubber, Nitrile rubber, Neoprene, PVC, Viton. The protective gloves to be used must comply with the specifications of the EC directive 89/686/EEC and the resultant standard EN 374. Suitability and durability of a glove is dependent on usage (e.g. frequency and duration of contact, other chemicals which may be handled, chemical resistance of glove material and dexterity). Always seek advice of the glove supplier as to the most suitable glove material.

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

Respiratory protection: In case of insufficient ventilation, wear suitable respiratory equipment. If inhalation of dust cannot be avoided, wear an approved particulate respirator.

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

Environmental exposure controls: See Sections 6 and 12.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Form:	Solid (grains)	**pH:**	8 (10% aqueous solution)
Appearance:	White	**Relative density:**	1.5 @ 20°C
Odour:	Odorless	**Partition coefficient (n-octanol/water):**	1.88 (Benzoic acid)
Odour threshold:	Not Available	**% Volatile by weight:**	Not Available
Solubility in water:	556 g/L	**VOC:**	<1 g/L
Evaporation rate:	Not Available	**Boiling point °C:**	Decomposes before boiling
Vapour pressure:	Negligible @ 20°C	**Boiling point °F:**	Decomposes before boiling
Vapour density:	Not Available	**Flash point:**	Not Applicable
Viscosity:	Not Available	**Autoignition temperature:**	Not Available
Melting point/Freezing point:	436°C (817°F)	**Flammability (solid, gas):**	Not flammable (may form combustible dust concentrations in air)
Oxidising properties:	Not oxidizing	**Flammability or explosive limits:**	LFL/LEL: Not Available
Explosive properties:	Not explosive		UFL/UEL: Not Available
Decomposition temperature:	450-475 °C (842-887 °F)	**Surface tension:**	72.9 mN/m @ 20°C (1 g/L)

9.2. Other information:

Amounts specified are typical and do not represent a specification.

Dust combustibility data: Product data (Purox® S grains): Minimum ignition energy (grains): >10000 mJ (extrapolated). Dust explosion class: St1.

Particle size variation is considered a critical factor in regards to dust explosion hazard information. The Minimum Ignition Energy (MIE) of a dust/air mix depends on the particle size the water content and the temperature of the dust. The finer and the dryer the dust the lower the MIE. The following results are not typical of the product as the test samples were processed by milling and/or sieving prior to testing. Unless specified differently below, the test samples were characterized with particle size: 24 um mean (distribution: 93% <75 um, 100% <500 um) and 0.2% moisture content.

- Minimum ignition energy: 10-<30 mJ with inductance, 30-<100 mJ without inductance.
- Minimum explosive concentration: 50-60 g/m3.
- Minimum autoignition temperature (MIT dust cloud): 540°C.
- Maximum rate of pressure rise (dP/dT average): 590 bars/sec.
- Maximum pressure of explosion (Pmax average): 7.1 bars-gauge.
- Deflagration Index, Kst: 160 bar-m/sec.
- Dust explosion class: St1.
- Volume resistivity (ambient relative humidity): >10(14) ohm-m (powder, particle size 100% <75 um).
- Volume resistivity (low relative humidity): >10(14) ohm-m (powder, particle size 100% <75 um).
- Charge decay (ambient relative humidity): 4.8 hours (powder, particle size 100% <75 um).
- Charge decay (low relative humidity): 6.8 hours (powder, particle size 100% <75 um).

SECTION 10: Stability and reactivity

10.1. Reactivity:

None known.

10.2. Chemical stability:

This product is stable.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will not occur.

10.4. Conditions to avoid:

Excessive heat and ignition sources. Contact with water or moist air. Avoid static discharge. Avoid dust formation.

10.5. Incompatible materials:

Avoid strong acids and oxidizing agents. Avoid contact with iron salts.

10.6. Hazardous decomposition products:

Carbon dioxide and carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects:

Information on likely routes of exposure:

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

Eyes: Causes serious eye irritation.

Skin: Repeated or prolonged skin contact may cause irritation. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation: Dust inhalation may cause respiratory irritation.

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

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

Chemical Name	Inhalation LC50	Species	Oral LD50	Species	Dermal LD50	Species
Sodium benzoate	>12.2 mg/L (4 hours, based on benzoic acid)	Rat/ adult	>2000 mg/kg (weight of evidence)	Rat/ adult	>2000 mg/kg (based on benzoic acid)	Rabbit/ adult

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

Chemical Name	Skin irritation	Species
Sodium benzoate	Non-irritant (OECD 404)	Rabbit/ adult

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

Chemical Name	Eye irritation	Species
Sodium benzoate	Irritant (OECD 405)	Rabbit/ adult

Respiratory or skin sensitization: Not classified (based on available data, the classification criteria are not met). READ-ACROSS (BENZOIC ACID): Not a skin sensitizer in the mouse local lymph node assay or Buehler guinea pig test.

Chemical Name	Skin sensitisation	Species
Sodium benzoate	Non-sensitizer (read-across)	Guinea pig and Mouse local lymph node assay

Carcinogenicity: Not classified (based on available data, the classification criteria are not met). SODIUM BENZOATE: In a 2-year animal feeding study (2% in food), sodium benzoate was not carcinogenic.

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). SODIUM BENZOATE: No mutagenic activity was observed in the in-vitro Ames tests. Positive mutagenic effects have been observed in most in-vitro chromosome abberation testing. Sodium benzoate showed no genotoxicity during in-vivo testing.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). BENZOIC ACID AND BENZOATE SALTS: Reproductive toxicity (benzoic acid), 4-generation oral study in rats: NOAEL (no-observed adverse-effect-level) 500 mg/kg bw/day. Developmental toxicity (sodium benzoate), oral, rats and mice: NOAEL of >=175 mg/kg bw/day can be established for developmental effects.

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

Specific target organ toxicity (STOT) - repeated exposure: Not classified (based on available data, the classification criteria are not met). BENZOIC ACID AND BENZOATE SALTS: At higher doses (oral) increased mortality, reduced weight gain, convulsions (central nervous system effects), liver and kidney effects were observed. SODIUM BENZOATE: Repeated dose oral toxicity studies for salts of benzoic acids: NOAEL (no-observed-adverse-effect-level) 1000 mg/kg bw/day. READ-ACROSS (BENZOIC ACID): Repeated dose toxicity study, inhalation: NOAEC (No-Observed-Adverse-Effect-Concentration),

inhalation, rat: 250 mg/m3 (systemic effects); 25 mg/m3 (local). Local effects including nasal redness, pulmonary fibrosis and inflammatory cell infitrates in the lungs were observed at lowest dose of 25 mg/m3 and can be attributed to the irritant properties and to the physico-chemical properties of fine low-solubility particles of benzoic acid. NOAEL (No-Observed-Adverse-Effect-Level), dermal, rabbit - 2500 mg/kg bw/day.

Aspiration hazard: Not classified (technical impossibility to obtain the data).

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

Chemical Name	Species	Acute	Acute	Chronic
Sodium benzoate	Fish	LC50 484 mg/L (96 hours)	LC50 >100 mg/L(96 hours)	NOEC 10 mg/L (144 hours)
Sodium benzoate	Invertebrates	EC50 >100 mg/L (96 hours)	EC50 650 mg/L(48 hours)	N/E
Sodium benzoate	Algae	EC50 >30.5 mg/L (72 hours)	N/E	EC10 6.5 mg/L(72 hours)
Sodium benzoate	Micro-organisms	EC50 >100 mg/L (168 hours)		

12.2. Persistence and degradability:

Chemical Name	Biodegradation
Sodium benzoate	Readily biodegradable

12.3. Bioaccumulative potential:

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
Sodium benzoate	N/E	1.88 (Benzoic acid)

12.4. Mobility in soil:

Chemical Name	Mobility in soil (Koc/Kow)
Sodium benzoate	N/E

12.5. Results of PBT and vPvB assessment:

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

12.6. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

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

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

SECTION 14: Transport information

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

14.1. UN number: N/A

14.2. UN proper shipping name:

Not regulated - See Bill of Lading for Details

14.3. Transport hazard class(es):

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

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

14.4. Packing group: N/A

14.5. Environmental hazards:

Marine pollutant: Not Applicable

Hazardous substance (USA): Not Applicable

14.6. Special precautions for user:

Not Applicable

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

Chemical Name	Category
Sodium benzoate	Category Z

SECTION 15: Regulatory information

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

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

EU Authorizations and/or restrictions on use: Not Applicable

Other EU information: No Additional Information

National regulations: No Additional Information

Chemical inventories:

Regulation	Status
Australian Inventory of 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.

15.2. Chemical safety assessment:

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

SECTION 16: Other information

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

H319 Causes serious eye irritation.

Reason for revision: Changes in Section(s): 8, 9, Annex

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

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.

ACGIH: American Conference of Governmental Industrial Hygienists

EU OELV: European Union Occupational Exposure Limit Value
EU IOELV: European Union Indicative Occupational Exposure Limit Value
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)

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

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

Annex

Exposure Scenarios

Substance information:

Name of substance: Sodium benzoate.
EC# 208-534-8 / CAS# 532-32-1
REACH Registration number: 01-2119460683-35-0000

List of exposure scenarios:

ES1: Formulation of washing and cleaning products
ES2: Formulation of cosmetics/personal care products
ES3: Formulation of adhesives and sealants
ES4: Formulation of powder coatings
ES5: Formulation of other coatings
ES6: Formulation of various products (FECC): Formulation of auxiliary for polymerisation, Formulation of antifreeze and deicing products, Formulation of fillers, putties, plasters, modelling clay, Formulation of finger paints, Formulation of preservative blends, Formulation of pharmaceuticals, Formulation of food
ES7: Use at industrial sites - Adhesives and surface treatment products
ES8: Consumer use of cosmetics/personal care products

General remarks:

Sodium benzoate is used as additive in formulation of preparations and as auxiliary in polymerization processes. In accordance to the Article 14 (2a-f) of the REACH Regulation (EC) No 1907/2006, exposure estimation and risk characterisation does not need to be performed if the substance in a preparation is less than 1%. Based on current knowledge there are no preparations / formulations which contain this substance in concentrations > 1% (with exception of the use as a laboratory agent) and therefore the life cycle ends after the formulation and industrial use stage.

The environmental exposure assessments have been performed using EUSES 2.1.2 which is part of Chemical Safety Assessment and Reporting tool (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 Technical Guidance Document on Risk Assessment(TGD), Part II (2003).

The worker exposure assessments have been performed using TRA Worker v3 which is part of Chemical Safety Assessment and Reporting tool (CHESAR v3.4). The primary long term routes of industrial exposure are skin contact and inhalation. In an industrial setting, ingestion is not an anticipated route of exposure. Sodium benzoate is classified as an eye irritant and implementation of the following risk management measures will ensure that the likelihood of an exposure occurring is negligible:
- P280: Wear eye protection/face protection.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337+P313: If eye irritation persists: Get medical advice/attention.

Exposure scenario (1): Formulation of washing and cleaning products

1. Exposure scenario (1)

Short title of the exposure scenario:

Formulation of washing and cleaning products

List of use descriptors:

Product category (PC): PC35

Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC14, PROC15

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

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.

The environment exposure assessment for this exposure scenario uses the following SpERC: AISE 2.1j.v2 Formulation of liquid Detergents/ Maintenance products: High viscosity (large scale).

This SpERC and the associated Risk Management Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Formulation of Granular Detergents/Maintenance Products-Regular & Compact (large/medium/small scale) (AISE 2.1a.v2/AISE 2.1b.v2/AISE 2.1c.v2); Formulation of liquid Detergents/Maintenance Products: Low Viscosity (large/medium/small scale) (AISE 2.1g.v2/AISE 2.1h.v2/AISE 2.1i.v2); High Viscosity (large/medium/small scale) (AISE 2.1j.v2/AISE 2.1k.v2/AISE 2.1l.v2).

Further explanations:

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.
Product characteristics:	Concentration of substance in mixture/article: <=1%. Physical form of the used product: - PROC1, PROC2, PROC3, PROC4, PROC5, PROC9: Liquid. - PROC8b, PROC14, PROC15: Solid (unspecified form). Vapour pressure: 0,00000371 Pa at 40 °C
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC2, PROC4, PROC5, PROC9, PROC14: 480 cm2 (two hands, face side only). - PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: <= 40 °C.

Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Basic general ventilation (1-3 air changes per hour): 0%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC4, PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC14, PROC15: No. Local exhaust ventilation: - PROC1: Not required. - PROC2, PROC3, PROC4, PROC5, PROC9, PROC14, 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: - PROC1, PROC2, PROC3, PROC14, PROC15: Not required. - PROC4, PROC8b, PROC9: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). - 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: No (Effectiveness Dermal: 0%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.
2.2 Control of environmental exposure	
General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.
Amounts used:	Maximum daily use at a site: 16,7 tons/day. Maximum annual use at a site: 4180 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. Release fraction to air from process (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (SpERC AISE 2.1j.v2). Release fraction to wastewater from process (initial release): 0.0001; (final release): 0.0001. Local release rate: 1,67 kg/day (maximum allowable release). Release fraction to soil from process (final release): 0.0 (SpERC AISE 2.1j.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 optimized for highly efficient use of raw materials (very minimal environmental release). Equipment cleaning: Equipment cleaning with minimized emissions to wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	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

Health

Information for contributing scenario (1): PROC5, PROC8b, PROC14

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1,371 mg/kg bw/day	0,022	PROC5, PROC8b
Worker, long-term, systemic	Inhalation	0,1 mg/m3	0,033	PROC14
Worker, long-term, systemic	Combined routes	N/A	0,039	PROC14
Worker, long-term, local	Inhalation	0,1 mg/m3	1,0	PROC14

Environment

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

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,015 mg/L	0,114	
Freshwater sediment	0,201 mg/kg dw	0,114	
Marine water	0,00148 mg/L	0,114	
Marine water sediment	0,02 mg/kg dw	0,114	
Soil	0,054 mg/kg dw	0,899	
STP	0,105 mg/L	0,01	
Man via environment	2,42E-12 mg/m3 / 0,00575 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

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

Health: Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC14, PROC15: LEV used. Duration: <=8 hours/day. Respiratory protection: PROC4, PROC8b, PROC9: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). PROC5: Yes (Respirator with APF of 20) (Effectiveness Inhalation: 95%). 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 (2): Formulation of cosmetics/personal care products

1. Exposure scenario (2)

Short title of the exposure scenario:

Formulation of cosmetics/personal care products

List of use descriptors:

Product category (PC): PC39

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

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

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.
The environment exposure assessment for this exposure scenario uses the following SpERC: Cosmetics Europe (CE) 2.1.h.v2 Formulation of Non-liquid Creams (large scale).

This SpERC and the associated Risk Management Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Formulation of low viscosity liquids (shampoo, hair conditioner, shower gel, foam bath) (large/medium/small scale) (CE 2.1.a.v2/ CE 2.1.b.v2/CE 2.1.c.v2); Formulation of Fine Fragrances - Cleaning with Water (medium scale) (CE 2.1.d.v2); Formulation of High Viscosity Body Care Products (medium/small scale) (CE 2.1.f.v2/CE 2.1.g.v2); Formulation of Non-liquid Creams (large/medium/small scale) (CE 2.1.h.v2/ CE 2.1.i.v2/ CE 2.1.j.v2); Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (large/medium/small scale) (CE 2.2.a.v2/CE 2.2.b.v2/CE 2.2.c.v2); Formulation of solid cosmetic and home care products (large/medium/small scale) (CE/AISE 2.3.a.v2/CE/AISE 2.3.b.v2/CE/AISE 2.3.c.v2).

Further explanations:

PC39 Cosmetics, personal care products.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance in mixture/article: <=1%. Physical form of the used product: - PROC1, PROC2, PROC3, PROC5, PROC9: Liquid. - PROC8a, PROC8b, PROC14, PROC15: Solid (unspecified form). Vapour pressure: 0,00000371 Pa at 40 °C
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC2, PROC5, PROC9, PROC14: 480 cm2 (two hands, face side only). - PROC8a, PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC1, PROC2, PROC3, PROC5, PROC8a, PROC15: Basic general ventilation (1-3 air changes per hour): 0%. - PROC8b, PROC14: Good general ventilation (3-5 air changes per hour): 30%. - PROC9: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC8a, PROC14, PROC15: No. Local exhaust ventilation: - PROC1, PROC2, PROC3, PROC15: Not required. - PROC5, PROC8a, PROC9, PROC14: 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: - PROC1, PROC2, PROC3, PROC8b, PROC9, PROC14, PROC15: Not required. - PROC5, PROC8a: 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: No (Effectiveness Dermal: 0%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.
2.2 Control of environmental exposure	
General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.
Amounts used:	Maximum daily use at a site: 1,6 tons/day. Maximum annual use at a site: 400 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. Release fraction to air from process (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (SpERC CE 2.1h.v2). Release fraction to wastewater from process (initial release): 0,001; (final release): 0,001. Local release rate: 1,6 kg/day (maximum allowable release). Release fraction to soil from process (final release): 0.0 (SpERC CE 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). On-site treatment of wastewater: Oil water separator. Process efficiency: Process optimized for highly efficient use of raw materials (very minimal environmental release). Equipment cleaning: Equipment cleaning with minimized emissions to wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC2, PROC3, PROC5, PROC8a, PROC8b

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1,371 mg/kg bw/day	0,022	PROC5, PROC8a, PROC8b
Worker, long-term, systemic	Inhalation	0,1 mg/m3	0,033	PROC2, PROC3
Worker, long-term, systemic	Combined routes	N/A	0,051	PROC8b

	Route	Exposure estimate	RCR	Notes
Worker, long-term, local	Inhalation	0,1 mg/m3	1,0	PROC2, PROC3

Environment

Information for contributing scenario (2): ERC2 (SpERC CE 2.1h.v2)

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,014 mg/L	0,111	
Freshwater sediment	0,195 mg/kg dw	0,111	
Marine water	0,00144 mg/L	0,11	
Marine water sediment	0,019 mg/kg dw	0,11	
Soil	0,053 mg/kg dw	0,883	
STP	0,1 mg/L	0,01	
Man via environment	2,42E-12 mg/m3 / 0,0057 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

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

Health: Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC5, PROC8a, PROC8b, PROC9, PROC14: LEV used. Duration: <=8 hours/day. Respiratory protection: PROC5, PROC8a: 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 (3): Formulation of adhesives and sealants

1. Exposure scenario (3)

Short title of the exposure scenario:

Formulation of adhesives and sealants

List of use descriptors:

Product category (PC): PC1

Process category (PROC): PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC10, PROC14

Environmental release category (ERC): ERC2 (FEICA SpERC 2.2a.v2)

List of names of contributing worker scenarios and corresponding PROCs:

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

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.

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.

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

PROC14 Tabletting, compression, extrusion, pelletisation, granulation. This covers processing of mixtures and/or substances into a defined shape for further use.

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

The environment exposure assessment for this exposure scenario uses the following SpERC: SpERC FEICA 2.2a.v2: Formulation of Water Borne adhesives - Volatiles.

This SpERC and the associated Risk Management Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Formulation of Solvent-less/Solvent Borne Adhesives - Solids (FEICA 2.1a.v2); Formulation of Solvent Borne Adhesives – Volatiles (large/small scale) (FEICA 2.1b.v2/FEICA 2.1c.v2); Formulation of Water Borne Adhesives – Volatiles (FEICA 2.2a.v2); Formulation of Water Borne Adhesives – Solids (FEICA 2.2b.v2).

Further explanations:

PC1 Adhesives, sealants.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance in mixture/article: <=1%. Physical form of the used product: - PROC2, PROC3, PROC4, PROC5, PROC9, PROC10: Liquid. - PROC8b, PROC14: Solid (unspecified form). Vapour pressure: 0,00000371 Pa at 40 °C
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC3: 240 cm2 (one hand, face side only). - PROC2, PROC4, PROC5, PROC9, PROC14: 480 cm2 (two hands, face side only). - PROC8b, PROC10: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC2, PROC3, PROC10, PROC14: Basic general ventilation (1-3 air changes per hour): 0%. - PROC4, PROC5, PROC8b, PROC9: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC4, PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC10, PROC14: No. Local exhaust ventilation: - PROC2, PROC3: Not required. - PROC4, PROC5, PROC9, PROC10, PROC14: 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: No (Effectiveness Dermal: 0%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.

2.2 Control of environmental exposure

General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.

Amounts used:	Maximum daily use at a site: 3,64 tons/day. Maximum annual use at a site: 800 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. Release fraction to air from process (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (non-volatile substance release to air unlikely). Release fraction to wastewater from process (initial release): 0,0005; (final release): 0,0005. Local release rate: 1,82 kg/day (maximum allowable release). Release fraction to soil from process (final release): 0.0 (SpERC FEICA 2.2a.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. Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC2, PROC3, PROC10, PROC14

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	2,743 mg/kg bw/day	0,044	PROC10
Worker, long-term, systemic	Inhalation	0,1 mg/m3	0,033	PROC2, PROC3, PROC10, PROC14
Worker, long-term, systemic	Combined routes	N/A	0,077	PROC10
Worker, long-term, local	Inhalation	0,1 mg/m3	1,0	PROC2, PROC3, PROC10, PROC14

Environment

Information for contributing scenario (2): ERC2 (SpERC FEICA 2.2a.v2)

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,016 mg/L	0,122	
Freshwater sediment	0,214 mg/kg dw	0,122	
Marine water	0,00157 mg/L	0,121	
Marine water sediment	0,021 mg/kg dw	0,121	
Soil	0,056 mg/kg dw	0,934	
STP	0,114 mg/L	0,011	
Man via environment	2,42E-12 mg/m3 / 0,00584 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC4, PROC5, PROC8b, PROC9, PROC10, PROC14: LEV used, no respirator required. Duration: <=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 (4): Formulation of powder coatings

1. Exposure scenario (4)

Short title of the exposure scenario:

Formulation of powder coatings

List of use descriptors:

Sector of use category (SU): SU10
Product category (PC): PC9a
Process category (PROC): PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9
Environmental release category (ERC): ERC2 (CEPE SpERC 2.1c.v1)

List of names of contributing worker scenarios and corresponding PROCs:

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

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.
The environment exposure assessment for this exposure scenario uses the following SpERC: CEPE 2.1c.v1: Formulation of Organic Solvent Borne Coatings and Inks - Solids.

This SpERC and the associated Risk Management Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Formulation of Organic Solvent Borne Coatings and Inks - Volatiles (large/small scale) (CEPE 2.1a.v1/CEPE 2.1b.v1); Formulation of Organic Solvent Borne Coatings and Inks - Solids (CEPE 2.1c.v1); Formulation of Water Borne Coatings and Inks - Volatiles (large/small scale) (CEPE 2.2a.v1/CEPE 2.2b.v1); Formulation of Water Borne Coatings and Inks - Solids (CEPE 2.2c.v1); Formulation of Powder Coatings and Inks - Solids (CEPE 2.3a.v1); Formulation of Liquid Coatings and Inks (where specific use not known) - Volatiles (large/small scale) (CEPE 2.4a.v1/CEPE 2.4b.v1); Formulation of Liquid Coatings and Inks (where specific use not known) - Solids (CEPE 2.4c.v1).

Further explanations:

PC9a Coatings and paints, thinners, paint removers.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance in mixture/article: <=1%. Physical form of the used product: Solid (unspecified form). Vapour pressure: 0,00000371 Pa at 40 °C
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3: 240 cm2 (one hand, face side only). - PROC2, PROC5, PROC9: 480 cm2 (two hands, face side only). - PROC8b: 960 cm2 (two hands).

Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC1, PROC2, PROC3: Basic general ventilation (1-3 air changes per hour): 0%. - PROC8b: Good general ventilation (3-5 air changes per hour): 30%. - PROC5, PROC9: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5: No. Local exhaust ventilation: - PROC1: Not required. - PROC2, PROC3, PROC5, PROC9: 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: No (Effectiveness Dermal: 0%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.
2.2 Control of environmental exposure	
General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations. On-site treatment of off-air: Air filtration - particle removal (Effectiveness Air: 99%).
Amounts used:	Maximum daily use at a site: 3,64 tons/day. Maximum annual use at a site: 800 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). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Indoor use. Release fraction to air from process (initial release): 0,0097; (final release): 0,000097. Local release rate: 0,353 kg/day (SpERC CEPE 2.1c.v1). Release fraction to wastewater from process (initial release): 0,00005; (final release): 0,00005. Local release rate: 0,182 kg/day (SpERC CEPE 2.1c.v1). Release fraction to soil from process (final release): 0.0 (SpERC CEPE 2.1c.v1).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Dry sludge application to agricultural soil: Yes (default). On-site treatment of off-air: Air filtration - particle removal (Effectiveness Air: 99%). Process efficiency: Process optimized for highly efficient use of raw materials (very minimal environmental release). 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; - Centralized process control; - Re-use of process grey water for cleaning; - Optimized and/or automated systems for the transport and handling of raw materials that minimize overall exposure levels and incidental spills; - Reduced number of transfer and cleaning operations through manufacturing of different products from one premix (masterbatch) to which certain ingredients are added to yield the final products; - Dedicated storage tanks for raw materials, premixes and final products; - Recovery of materials through recycling residues of granular detergents in cleaning steps at packaging or transfer lines into the slurries. Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC5, PROC8b

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1,371 mg/kg bw/day	0,022	PROC5, PROC8b
Worker, long-term, systemic	Inhalation	0,087 mg/m3	0,029	PROC8b
Worker, long-term, systemic	Combined routes	N/A	0,051	PROC8b
Worker, long-term, local	Inhalation	0,087 mg/m3	0,875	PROC8b

Environment

Information for contributing scenario (2): ERC2 (SpERC CEPE 2.1c.v1)

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00552 mg/L	0,042	
Freshwater sediment	0,075 mg/kg dw	0,042	
Marine water	0,000546 mg/L	0,042	
Marine water sediment	0,00739 mg/kg dw	0,042	
Soil	0,033 mg/kg dw	0,553	
STP	0,011 mg/L	<0,01	
Man via environment	0,0000591 mg/m3 / 0,014 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

4. Guidance to the Downstream User to evaluate whether he works inside the boundaries set by the ES	
Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC2, PROC3, PROC5, PROC8b, PROC9: LEV used, no respirator required. Duration: <=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): Formulation of other coatings

1. Exposure scenario (5)

Short title of the exposure scenario:

Formulation of other coatings

List of use descriptors:

Sector of use category (SU): SU10
Product category (PC): PC9a
Process category (PROC): PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9
Environmental release category (ERC): ERC2 (CEPE SpERC 2.2c.v1)

List of names of contributing worker scenarios and corresponding PROCs:

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

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.
The environment exposure assessment for this exposure scenario uses the following SpERC: CEPE 2.2c.v1: Formulation of Water Borne Coatings and Inks - Solids.

This SpERC and the associated Risk Management Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Formulation of Organic Solvent Borne Coatings and Inks - Volatiles (large/small scale) (CEPE 2.1a.v1/CEPE 2.1b.v1); Formulation of Organic Solvent Borne Coatings and Inks - Solids (CEPE 2.1c.v1); Formulation of Water Borne Coatings and Inks - Volatiles (large/small scale) (CEPE 2.2a.v1/CEPE 2.2b.v1); Formulation of Water Borne Coatings and Inks - Solids (CEPE 2.2c.v1); Formulation of Powder Coatings and Inks - Solids (CEPE 2.3a.v1); Formulation of Liquid Coatings and Inks (where specific use not known) - Volatiles (large/small scale) (CEPE 2.4a.v1/CEPE 2.4b.v1); Formulation of Liquid Coatings and Inks (where specific use not known) - Solids (CEPE 2.4c.v1).

Further explanations:

PC9a Coatings and paints, thinners, paint removers.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance in mixture/article: <=1%. Physical form of the used product: - PROC1, PROC2, PROC3, PROC5, PROC9: Liquid. - PROC8a, PROC8b: Solid (unspecified form). Vapour pressure: 0,00000371 Pa at 40 °C
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.

Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3: 240 cm2 (one hand, face side only). - PROC2, PROC5, PROC9: 480 cm2 (two hands, face side only). - PROC8a, PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC1, PROC2, PROC3: Basic general ventilation (1-3 air changes per hour): 0%. - PROC5, PROC8a, PROC8b, PROC9: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC8a: No. Local exhaust ventilation: - PROC1: Not required. - PROC2, PROC3, PROC5, PROC8a, PROC9: 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: - PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9: Not required. - PROC8a: 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: No (Effectiveness Dermal: 0%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.
2.2 Control of environmental exposure	
General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.
Amounts used:	Maximum daily use at a site: 3,64 tons/day. Maximum annual use at a site: 800 tons/year.
Frequency and duration of use:	Emission days: 225 days/year.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (default). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Indoor use. Release fraction to air from process (initial release): 0,000097; (final release): 0,000097. Local release rate: 0,353 kg/day (SpERC CEPE 2.2c.v1). Release fraction to wastewater from process (initial release): 0,00005; (final release): 0,00005. Local release rate: 0,182 kg/day (SpERC CEPE 2.2c.v1). Release fraction to soil from process (final release): 0.0 (SpERC CEPE 2.2c.v1).
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Dry sludge application to agricultural soil: Yes (default). Process efficiency: Process optimized for highly efficient use of raw materials (very minimal environmental release). Equipment cleaning: Equipment cleaned with water, washing disposed of with wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

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

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	1,371 mg/kg bw/day	0,022	PROC5, PROC8a, PROC8b
Worker, long-term, systemic	Inhalation	0,075 mg/m3	0,025	PROC5
Worker, long-term, systemic	Combined routes	N/A	0,047	PROC5
Worker, long-term, local	Inhalation	0,075 mg/m3	0,75	PROC5

Environment

Information for contributing scenario (2): ERC2 (SpERC CEPE 2.2c.v1)

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00552 mg/L	0,042	
Freshwater sediment	0,075 mg/kg dw	0,042	
Marine water	0,000546 mg/L	0,042	
Marine water sediment	0,00739 mg/kg dw	0,042	
Soil	0,033 mg/kg dw	0,553	
STP	0,011 mg/L	<0,01	
Man via environment	0,0000591 mg/m3 / 0,014 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9: LEV used. Duration: <=8 hours/day. Respiratory protection: PROC8a: 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 (6): Formulation of various products (FECC): Formulation of auxiliary for polymerisation, Formulation of antifreeze and deicing products, Formulation of fillers, putties, plasters, modelling clay, Formulation of finger paints, Formulation of preservative blends, Formulation of pharmaceuticals, Formulation of food

1. Exposure scenario (6)

Short title of the exposure scenario:

Formulation of various products (FECC): Formulation of auxiliary for polymerisation, Formulation of antifreeze and deicing products, Formulation of fillers, putties, plasters, modelling clay, Formulation of finger paints, Formulation of preservative blends, Formulation of pharmaceuticals, Formulation of food

List of use descriptors:

Sector of use category (SU): SU10
Product category (PC): PC0, PC9a, PC9b, PC9c, PC29, PC32.
Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC14, PROC15
Environmental release category (ERC): ERC2

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.
PROC6 Calendering operations. Processing of large surfaces at elevated temperature e.g. calendering of textile, rubber or paper.
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 in laboratories (less than or equal to 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

Further explanations:

PC0 Other.
PC9a Coatings and paints, thinners, paint removers.
PC9b Fillers, putties, plasters, modelling clay.
PC9c Finger paints.
PC29 Pharmaceuticals.
PC32 Polymer preparations and compounds.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance in mixture/article: Unless otherwise stated, <=1%. PROC9: <=100%. Physical form of the used product: - PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC9: Liquid. - PROC8a, PROC8b, PROC14, PROC15: Solid (unspecified form). Vapour pressure: 0,00000371 Pa at 40 °C; 0,00000141 Pa at 25°C.
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC2, PROC4, PROC5, PROC9, PROC14: 480 cm2 (two hands, face side only). - PROC6, PROC8a, PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: - PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8b, PROC9, PROC14, PROC15: <= 40 °C. - PROC8a: <= 25 °C.

Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC1, PROC3, PROC14: Basic general ventilation (1-3 air changes per hour): 0%. - PROC2, PROC4, PROC15: Good general ventilation (3-5 air changes per hour): 30%. - PROC5, PROC6, PROC8a, PROC8b, PROC9: Enhanced general ventilation (5-10 air changes per hour): 70%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC2: Closed continuous process with occasional controlled exposure. - PROC3: Closed batch process with occasional controlled exposure. - PROC4, PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC6, PROC8a, PROC14, PROC15: No. Local exhaust ventilation: - PROC1, PROC2, PROC3: Not required. - PROC4, PROC5, PROC6, PROC8a, PROC9, PROC14, 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: - PROC1, PROC2, PROC3, PROC5, PROC6, PROC8b, PROC14, PROC15: Not required. - PROC4, PROC8a, PROC9: 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, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC14, PROC15: No (Effectiveness Dermal: 0%). - PROC4: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.
2.2 Control of environmental exposure	
General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.
Amounts used:	Maximum daily use at a site: 0,92 ton/day. Maximum annual use at a site: 275 tons/year.
Frequency and duration of use:	Emission days: 300 days/year.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (default).
Other given operational conditions affecting environmental exposure:	Indoor use. Release fraction to air from process (initial release): 0,00005; (final release): 0,00005. Local release rate: 0,046 kg/day (EU TGD (2003) Table A2.1). Release fraction to wastewater from process (initial release): 0,002; (final release): 0,002. Local release rate: 1,84 kg/day (maximum allowable release). Release fraction to soil from process: 0,0001 (EU TGD 2003 Table A2.1).
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 (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC3, PROC9, PROC14

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	6,86 mg/kg bw/day	0,11	PROC9
Worker, long-term, systemic	Inhalation	0,1 mg/m3	0,033	PROC3, PROC14
Worker, long-term, systemic	Combined routes	N/A	0,13	PROC9
Worker, long-term, local	Inhalation	0,1 mg/m3	1,0	PROC3, PROC14

Environment

Information for contributing scenario (2): ERC2

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,016 mg/L	0,122	
Freshwater sediment	0,216 mg/kg dw	0,123	
Marine water	0,00159 mg/L	0,122	
Marine water sediment	0,021 mg/kg dw	0,122	
Soil	0,056 mg/kg dw	0,939	
STP	0,115 mg/L	0,012	
Man via environment	0,0000105 mg/m3 / 0,00746 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

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

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC14, PROC15: LEV used, PROC4: with gloves. Duration: <=8 hours/day. Respiratory protection: PROC4, PROC8a, PROC9: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). Concentration of substance in mixture/article: Unless otherwise stated, <=1%. PROC9: <=100%.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (7): Use at industrial sites - Adhesives and surface treatment products

1. Exposure scenario (7)

Short title of the exposure scenario:

Use at industrial sites - Adhesives and surface treatment products

List of use descriptors:

Sector of use category (SU): SU0
Product category (PC): PC1
Process category (PROC): PROC7, PROC19
Environmental release category (ERC): ERC4 (SpERC FEICA SpERC 4.2a.v2), ERC5 (SpERC FEICA 5.1a.v3)

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.
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:

ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article).
ERC5 Use at industrial site leading to inclusion into/onto article.
The environment exposure assessment for this exposure scenario uses the following SpERCs:
- ERC4: FEICA 4.2a.v2 Industrial Use of Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives.
- ERC5: FEICA 5.1a.v3 Industrial use of non-volatile Substances in Solvent-borne and Solvent-less Adhesives / Sealants

This SpERC and the associated Risk Management Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Industrial Use of Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives (FEICA 4.2a.v2); Industrial Use of Volatiles in Solvent-borne and Solvent-less Adhesives / Sealants (FEICA 4.2b.v3); Industrial Use of Volatiles in Water-borne Adhesives (FEICA 4.1c.v1); Industrial use of non-volatile Substances in Solvent-borne and Solvent-less Adhesives / Sealants (FEICA 5.1a.v3); Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives (FEiCA5.1b.v2); Industrial use of non-volatile Substances in Water-borne Adhesives / Sealants (FEICA 5.1c.v3).

Further explanations:

PC1 Adhesives, sealants.

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

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.
Product characteristics:	Concentration of substance in mixture/article: <=1%. Physical form of the used product: Liquid. Vapour pressure: 0,00000371 Pa at 40 °C
Frequency and duration of use/exposure:	Duration of activity: <=8 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC7: 1500 cm2 (two hands and upper wrists). - PROC19: 1980 cm2 (two hands and forearms).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Process temperature: <= 40 °C.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: Basic general ventilation (1-3 air changes per hour): 0%. Local exhaust ventilation: - PROC7: Yes (95% effectiveness). - PROC19: 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: - PROC7: Yes (Respirator with APF of 10) (Effectiveness Inhalation: 90%). - PROC19: 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: No (Effectiveness Dermal: 0%). Generally accepted standards of occupational hygiene are maintained.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Minimisation of manual phases/work tasks. Minimisation of splashes and spills. Avoidance of contact with contaminated tools and objects. Regular cleaning of equipment and work area. Training staff on good practice.

2.2 Control of environmental exposure

General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.
Amounts used:	Maximum daily use at a site: - ERC4: 0,6 tons/day. - ERC5: 4,5 tons/day. Maximum annual use at a site: - ERC4: 60 tons/year. - ERC5: 1000 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). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Indoor/Outdoor use. Release fraction to air from process: - ERC4: (initial release): 0,985; (final release): 0,985. Local release rate: 591 kg/day (SpERC FEICA 4.2a.v2). - ERC5: (initial release): 0,017; (final release): 0,017. Local release rate: 76,5 kg/day (SpERC FEICA 5.1a.v2). Release fraction to wastewater from process (initial release): 0,0; (final release): 0,0. Local release rate: 0 kg/day (SpERC FEICA 4.2a.v2, 5.1a.v2). Release fraction to soil from process (final release): 0.0 (SpERC FEICA 4.2a.v2, 5.1a.v2). Type of process: - ERC4: Solvent-based process. - ERC5: Dry process (no water used in process).
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: - ERC4: Process with efficient use of raw materials. - ERC5: Automation in raw materials handling (manual/automatic dosing); High degree of automation in adhesive/sealant formulation. Equipment cleaning: Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC7, PROC19

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

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

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	14,14 mg/kg bw/day	0,226	PROC19
Worker, long-term, systemic	Inhalation	0,05 mg/m3	0,017	PROC7
Worker, long-term, systemic	Combined routes	N/A	0,226	PROC19
Worker, long-term, local	Inhalation	0,05 mg/m3	0,5	PROC7

Environment

Information for contributing scenario (2): ERC4 (SpERC FEICA 4.2a), ERC5 (SpERC FEICA 5.1a)

Assessment method: EUSES 2.1.2. Only highest figures are presented here.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00437 mg/L	0,034	ERC4, ERC5
Freshwater sediment	0,059 mg/kg dw	0,034	ERC4, ERC5
Marine water	0,000432 mg/L	0,033	ERC4, ERC5
Marine water sediment	0,00585 mg/kg dw	0,033	ERC4, ERC5
Soil	0,043 mg/kw dw	0,725	ERC4
STP	0 mg/L	<0,01	ERC4, ERC5
Man via environment	0,045 mg/m3 / 6,762 mg/kg bw/day	0,03 / 0,407	Inhalation / Oral (ERC4)
Man via environment-Combined routes	N/A	0,437	ERC4

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: LEV used. Duration: <=8 hours/day. Respiratory protection: PROC7: 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 (8): Consumer use of cosmetics/personal care products

1. Exposure scenario (8)

Short title of the exposure scenario:

Consumer use of cosmetics/personal care products

List of use descriptors:

Product category (PC): PC39

Environmental release category (ERC): ERC8a (SpERC Cosmetics Europe (CE) 8a.1a.v2)

Name of contributing environmental scenario and corresponding ERCs:

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

The environment exposure assessment for this exposure scenario uses the following SpERC: Cosmetics Europe (CE) 8a.1.a.v2 Wide Dispersive Use in 'Down the Drain' products - hair and skin care products.

This SpERC and the associated Risk Manage Measures (RMM) and Release Factors should cover all of the production types described by these SpERCs: Wide Dispersive Use in 'Down the Drain' products - hair and skin care products (CE 8a.1.a.v2); Wide Dispersive Use of Aerosol products for hair and skin care (Propellants) (CE 8a.1.b.v2); Wide Dispersive Use of Aerosol products for hair and skin care (Non-Propellants) (CE 8a.1.c.v2).

Further explanations:

PC39 Cosmetics, personal care products.

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

2. Conditions of use affecting exposure

2.1 Control of consumer exposure

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

2.2 Control of environmental exposure

General:	Special attention should be taken to the conditions set out in this Exposure Scenario to ensure each site uses the RMMs described and that emissions to water, air and soil are kept below the Release Factors modelled. All risk management measures utilised must also comply with all relevant local regulations.
Amounts used:	Daily wide dispersive use: 0,00109 tons/day. Fraction of the main local source: 0.00075. Percentage of tonnage used at regional scale: 5,3 %.
Frequency and duration of use:	Emission days: <=365 days/year.

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: 0,0 (SpERC CE 8a.1a.v2). Release fraction to wastewater from process: 1,0. Local release rate: 1,09 kg/day (SpERC CE 8a.1a.v2). Release fraction to soil from process: 0,0 (SpERC CE 8a.1a.v2). Type of process: Substance applied in aqueous process solution with negligible volatilization.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Dry sludge application to agricultural soil: Yes (default).
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (Effectiveness Water: 87,44%). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Environment

Information for contributing scenario (2): ERC8a (SpERC Cosmetics Europe 8a.1a.v2)

Assessment method: EUSES 2.1.2.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,011 mg/L	0,086	
Freshwater sediment	0,152 mg/kg dw	0,086	
Marine water	0,00112 mg/L	0,086	
Marine water sediment	0,015 mg/kg dw	0,086	
Soil	0,046 mg/kg dw	0,764	
STP	0,068 mg/L	<0,01	
Man via environment	2,42E-12 mg/m3 / 0,00536 mg/kg bw/day	<0,01 / <0,01	Inhalation / Oral
Man via environment-Combined routes	N/A	<0,01	

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

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

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