



Safety Data Sheet

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

Revision date: 2019-02-14

Supersedes: 2019-01-31

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

1.1. Product identifier:

Product trade name: Kalama* Sodium benzoate NF/FCC
Company product number: SBDENSE
REACH registration number: 01-2119460683-35-0029
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. Industrial applications. Food and pharmaceutical applications. Auxiliary in polymerization processes. See Annex for covered uses.
Uses advised against: None identified

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

Manufacturer/Supplier: Emerald Performance Materials, LLC
1499 SE Tech Center Place, Suite 300
Vancouver, WA 98683
United States
Telephone: +1-360-954-7100
FAX: +1-360-954-7201

EU Only Representative: Penman Consulting bvba
Avenue des Arts 10
B-1210 Brussels
Belgium
Telephone: +32 (0) 2 305 0698
email: pcbvba09@penmanconsulting.com

For further information about this SDS: Email: product.compliance@emeraldmaterials.com

1.4. Emergency telephone number:

ChemTel (24 hours): 1-800-255-3924 (USA); +1-813-248-0585 (outside USA);
1-300-954-583 (Australia); 000-800-100-4086 (India).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

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

Eye Irritation, category 2, H319

2.2. Label elements:

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

Hazard pictogram(s):



Signal word:

Warning

Hazard statements:

SDS Name: Kalama* Sodium benzoate NF/FCC

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:

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Weight%</u>	<u>Classification</u>	<u>H Statements</u>
0000532-32-1	Sodium benzoate	98-100	Eye Irrit. 2	H319
<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Weight%</u>	<u>REACH Registration No.</u>	<u>EC/List Number</u>
0000532-32-1	Sodium benzoate	98-100	01-2119460683-35-0029	208-534-8

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

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

SECTION 4: First aid measures

4.1. Description of first aid measures:

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

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

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

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

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

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

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

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):**

<u>Chemical Name</u>	<u>EU OELV</u>	<u>EU IOELV</u>	<u>ACGIH - TWA/Ceiling</u>	<u>ACGIH - STEL</u>
Sodium benzoate	N/E	N/E	N/E	N/E
<u>Chemical Name</u>	<u>UK WEL</u>	<u>Ireland OEL</u>		
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**

<u>Population</u>	<u>Route</u>	<u>Acute (local)</u>	<u>Acute (systemic)</u>	<u>Long Term (local)</u>	<u>Long Term (systemic)</u>
Workers	Inhalation	N/E	N/E	0,1 mg/m ³	3 mg/m ³
Workers	Dermal	N/E	N/E	N/E	62,5 mg/kg bw/day
General population	Inhalation	N/E	N/E	0,06 mg/m ³	1,5 mg/m ³
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

Predicted No Effect Concentration (PNECs):**Sodium benzoate**

<u>Compartment</u>	<u>PNEC</u>
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	0,276 mg/kg dw
STP	10 mg/L
Oral	300 mg/kg food

8.2. Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation 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

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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:	Granules, pellets or powder	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:	Not Available
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: 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.

- Minimum ignition energy (pellet): 10000 mJ
- Dust explosion class: 1

Results applicable as follows: sample particle size <75 um, 0.2% moisture content. Sample tested is not typical of product.:

- Minimum ignition energy (dust cloud): 25-50 mJ
- Minimum ignition energy (particle size <63 um): 30-100 mJ
- Minimum explosive concentration: 50-60 g/m³
- Maximum rate of pressure rise: 465 bars/sec @ 500 g/m³
- Maximum pressure of explosion: 7.4 bars-gauge @ 500 g/m³
- Deflagration Index, K_{st} (estimate): 126 bar-m/sec
- Volume resistivity (ambient relative humidity): >10(14) ohm-m
- Volume resistivity (low relative humidity): >10(14) ohm-m
- Charge decay (ambient relative humidity): 4.8 hours
- Charge decay (low relative humidity): 6.8 hours

SECTION 10: Stability and reactivity

10.1. Reactivity:

None known.

10.2. Chemical stability:

This product is stable.

10.3. Possibility of hazardous reactions:

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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).

<u>Chemical Name</u>	<u>Inhalation LC50</u>	<u>Species</u>	<u>Oral LD50</u>	<u>Species</u>	<u>Dermal LD50</u>	<u>Species</u>
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).

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

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

<u>Chemical Name</u>	<u>Eye irritation</u>	<u>Species</u>
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.

<u>Chemical Name</u>	<u>Skin sensitisation</u>	<u>Species</u>
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 aberration 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). 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

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(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 infiltrates 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. 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.

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

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

<u>Chemical Name</u>	<u>Species</u>	<u>Acute</u>	<u>Acute</u>	<u>Chronic</u>
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)

12.2. Persistence and degradability:

<u>Chemical Name</u>	<u>Biodegradation</u>
Sodium benzoate	Readily biodegradable

12.3. Bioaccumulative potential:

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

12.4. Mobility in soil:

<u>Chemical Name</u>	<u>Mobility in soil (Koc/Kow)</u>
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

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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

Sodium benzoate

Category

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 Chemical Substances (AICS):

Y

Canadian Domestic Substances List (DSL):

Y

Canadian Non-Domestic Substances List (NDSL):

N

China Inventory of Existing Chemical Substances (IECSC):

Y

European EC Inventory (EINECS, ELINCS, NLP):

Y

Japan Existing and New Chemical Substances (ENCS):

Y

Japan Industrial Safety and Health Law (ISHL):

Y

Korean Existing and Evaluated Chemical Substances (KECL):

Y

New Zealand Inventory of Chemicals (NZIoC):

Y

Philippines Inventory of Chemicals and Chemical Substances (PICCS):

Y

Taiwan Inventory of Existing Chemicals:

Y

U.S. Toxic Substances Control Act (TSCA):

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; 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): Annex

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

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.

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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: 01-2119460683-35-0029

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 biocides, Formulation of pharmaceuticals, Formulation of food

ES7: 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. 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. 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.

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:

Sector of use category (SU): SU10

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

Environmental release category (ERC): ERC2/CEFIC SpERC AISE 1-12

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.

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

PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

SpERC AISE 1-12: Formulation of Detergents/Maintenance Products: Granular Detergent -Regular, Granular Detergent -Compact; Formulation of liquid Detergents/Maintenance Products: Low Viscosity, High Viscosity, High Low Viscosity.

Further explanations:

This emission scenario was based upon CEFIC (European Chemical Industry Council) specific environmental release categories (SpERCs).

Exposure of consumers to substance can be excluded, due to the formulation process being exclusively in an industrial setting.

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: Up to 1% (PROC 1, PROC2, PROC3, PROC4, PROC5, PROC9); Up to 100% (PROC8b, PROC14, PROC15). Physical state: liquid (PROC 1, PROC2, PROC3, PROC4, PROC5, PROC9); solid (PROC8b, PROC14, PROC15).
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration: >4 hours/day. Frequency: Repeated exposure (working life, <=240 days/year; 5 days/week).
Human factors not influenced by risk management:	Exposed skin surface: 480 cm ² (two hands, face side only).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: Not required.
Conditions and measures related to personal protection, hygiene and health evaluation:	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:	All risk management measures utilised must also comply with all relevant local regulations. Several scenarios are presented which can demonstrate safe use: (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L AISE 10 was selected as the worst case environmental release category.
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: liquid.

Amounts used: Maximum daily use at a site: 19091 kg/day (a) / 134091 kg/day (b).
 Maximum annual use at a site: 4200 tons/year (a) / 29500 tons/year (b).
 Fraction of the main local source: 1.
 (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

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:	Industry category: 15/0: Others. Use category: 9: Cleaning/washing agents and additives. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0 (AISE 10). Release fraction to wastewater from process: 0.001 (AISE 10). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0 (AISE 10).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).
Conditions and measures related to municipal sewage treatment plant:	Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town). Fraction of emissions degraded in STP: Efficiency=86.5% (a) / Efficiency=98% (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Conditions and measures related to external treatment of waste for disposal:	Not relevant (a) / Sludge is incinerated. Efficiency = 100% reduction of sludge concentrations (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. Any wastes and solutions that contain residues of substance are disposed in accordance to national and international regulations. 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
 Assessment method: ECETOC TRA Worker. 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.

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Dermal	13,7 mg/kg bw/day	0,219	PROC5
Worker, long-term, systemic	Inhalation	0,5 mg/m3	0,167	PROC5
Worker, long-term, systemic	Combined routes	N/A	0,386	PROC5

Environment

Information for contributing scenario (2): ERC2/CEFIC SpERC AISE 10.
 Assessment method: EUSES v2.1. Only values calculated for CEFIC SpERC AISE 10 (selected as the worst case environmental release category) are presented here.
 Exposure estimation: (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

<u>Compartment</u>	<u>PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,12 mg/L (a)/0,125 mg/L (b)	0,922 (a)/0,963 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,62 mg/kg dw (a)/1,7 mg/kg dw (b)	0,922 (a)/0,963 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,012 mg/L (a)/0,0125 mg/L (b)	0,922 (a)/0,963 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,162 mg/kg dw (a)/0,17 mg/kg dw (b)	0,922 (a)/0,963 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

Compartment	PEC	RCR	Notes
Soil	0,267 mg/kg dw (a)/0,00332 mg/kg dw (b)	0,969 (a)/0,0121 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	1,2 mg/L (a)/1,25 mg/L (b)	0,12 (a)/0,125 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

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: Indoor use, without LEV, no respirator required. Duration of activity >4 hours. Exposed skin surface: 480 cm² (two hands, face side only). Concentration of substance: Up to 1% (PROC 1, PROC2, PROC3, PROC4, PROC5, PROC9); Up to 100% (PROC8b, PROC14, PROC15).

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. Maximum daily use at a site: 19091 kg/day (a) / 134091 kg/day (b). Several scenarios are presented which can demonstrate safe use:

(a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment

(b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment

(c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L

Concentration in receiving waters can be calculated using the following equation: Concentration in receiving waters (mg/L) = (daily batch size of sodium benzoate (kg) * 1E+6 * Fraction released to waste water * Fraction of concentration reduction from pre-treatment of aqueous waste * Fraction partitioning in STP to water) / (Flow rate of STP (m³/d) + Flow rate of receiving waters (m³/d) * 1E+3)

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:

Sector of use category (SU): SU10

Product category (PC): PC39

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

Environmental release category (ERC): ERC2/CEFIC SpERC COLIPA 1-16

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

PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

SpERC COLIPA 1-16: Formulation of low viscosity liquids; Formulation of Fine Fragrances; Formulation of Medium Viscosity Body Care Products; Formulation of High Viscosity Body Care Products; Formulation of Non-liquid Creams; Formulation of cosmetic products involving cleaning with Organic Solvents; Formulation of body care soap.

Further explanations:

This emission scenario was based upon CEFIC (European Chemical Industry Council) specific environmental release categories (SpERCs). Exposure of consumers to substance can be excluded, due to the formulation process being exclusively in an industrial setting.

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: Up to 1% (PROC 1, PROC2, PROC3, PROC5, PROC9); Up to 100% (PROC8a, PROC8b, PROC14, PROC15). Physical state: liquid (PROC 1, PROC2, PROC3, PROC5, PROC9); solid (PROC8a, PROC8b, PROC14, PROC15).
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration: >4 hours/day. Frequency: Repeated exposure (working life, <=240 days/year; 5 days/week).
Human factors not influenced by risk management:	Exposed skin surface: 960 cm ² (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: Not required.
Conditions and measures related to personal protection, hygiene and health evaluation:	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:	All risk management measures utilised must also comply with all relevant local regulations. Several scenarios are presented which can demonstrate safe use: (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L COLIPA 8 was selected as the worst case environmental release category.
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: liquid.
Amounts used:	Maximum daily use at a site: 1818 kg/day (a) / 12727 kg/day (b). Maximum annual use at a site: 400 tons/year (a) / 2800 tons/year (b). Fraction of the main local source: 1. (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
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 m ³ /day (default). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Industry category: 5/0: Personal/Domestic use. Use category: 15: Cosmetics. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0 (COLIPA 8). Release fraction to wastewater from process: 0.01 (COLIPA 8). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0 (COLIPA 8).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).

Conditions and measures related to municipal sewage treatment plant:	Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town). Fraction of emissions degraded in STP: Efficiency=86.5% (a) / Efficiency=98% (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Conditions and measures related to external treatment of waste for disposal:	Not relevant (a) / Sludge is incinerated. Efficiency = 100% reduction of sludge concentrations (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. Any wastes and solutions that contain residues of substance are disposed in accordance to national and international regulations. 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

Assessment method: ECETOC TRA Worker. 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.

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Dermal	13,7 mg/kg bw/day	0,219	PROC5, PROC8a
Worker, long-term, systemic	Inhalation	0,5 mg/m3	0,167	PROC5, PROC8a
Worker, long-term, systemic	Combined routes	N/A	0,386	PROC5, PROC8a

Environment

Information for contributing scenario (2): ERC2/CEFIC SpERC COLIPA 8

Assessment method: EUSES v2.1. Only values calculated for CEFIC SpERC COLIPA 8 (selected as the worst case environmental release category) are presented here.

Exposure estimation: (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

<u>Compartment</u>	<u>PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,114 mg/L (a)/0,119 mg/L (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,55 mg/kg dw (a)/1,61 mg/kg dw (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0114 mg/L (a)/0,0119 mg/L (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,155 mg/kg dw (a)/0,161 mg/kg dw (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,254 mg/kg dw (a)/0,00332 mg/kg dw (b)	0,923 (a)/0,0121 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	1,14 mg/L (a)/1,18 mg/L (b)	0,114 (a)/0,118 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

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:	Indoor use, without LEV, no respirator required. Duration of activity >4 hours. Exposed skin surface: 960 cm2 (two hands). Concentration of substance: Up to 1% (PROC 1, PROC2, PROC3, PROC5, PROC9); Up to 100% (PROC8a, PROC8b, PROC14, PROC15).
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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. Maximum daily use at a site: 1818 kg/day (a) / 12727 kg/day (b). Several scenarios are presented which can demonstrate safe use:

(a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment

(b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment

(c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L

Concentration in receiving waters can be calculated using the following equation: Concentration in receiving waters (mg/L) = (daily batch size of sodium benzoate (kg) * 1E+6 * Fraction released to waste water * Fraction of concentration reduction from pre-treatment of aqueous waste * Fraction partitioning in STP to water) / (Flow rate of STP (m3/d) + Flow rate of receiving waters (m3/d) * 1E+3)

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:

Sector of use category (SU): SU10

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

Environmental release category (ERC): ERC2/CEFIC SpERC FEICA 1-5

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 Tableting, 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.

SpERC FEICA 1-5: Formulation of Solventless/ Solvent Borne Adhesives - Solids; Formulation of Solvent Borne adhesives - Volatiles;

Formulation of Water Borne adhesives - Volatiles, Solids.

Further explanations:

This emission scenario was based upon CEFIC (European Chemical Industry Council) specific environmental release categories (SpERCs).

Exposure of consumers to substance can be excluded, due to the formulation process being exclusively in an industrial setting.

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: Up to 1% (PROC2, PROC3, PROC4, PROC5, PROC9, PROC10); Up to 100% (PROC8b, PROC14). Physical state: liquid (PROC2, PROC3, PROC4, PROC5, PROC9, PROC10); solid (PROC8b, PROC14).
Amounts used:	This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:	Duration: >4 hours/day. Frequency: Repeated exposure (working life, <=240 days/year; 5 days/week).
Human factors not influenced by risk management:	Exposed skin surface: 480 cm ² (two hands, face side only).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: Not required.
Conditions and measures related to personal protection, hygiene and health evaluation:	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:	All risk management measures utilised must also comply with all relevant local regulations. Several scenarios are presented which can demonstrate safe use: (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L FEICA 5 was selected as the worst case environmental release category.
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: liquid.
Amounts used:	Maximum daily use at a site: 3636 kg/day (a) / 25455 kg/day (b). Maximum annual use at a site: 800 tons/year (a) / 5600 tons/year (b). Fraction of the main local source: 1. (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
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 m ³ /day (default). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Industry category: 14: Paints, lacquers and varnishes industry. Use category: 55: Others. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0.01 (FEICA 5). Release fraction to wastewater from process: 0.005 (FEICA 5). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0 (FEICA 5).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).
Conditions and measures related to municipal sewage treatment plant:	Size of municipal sewage system/treatment plant: >=2000 m ³ /day (standard town). Fraction of emissions degraded in STP: Efficiency=86.5% (a) / Efficiency=98% (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Conditions and measures related to external treatment of waste for disposal:	Not relevant (a) / Sludge is incinerated. Efficiency = 100% reduction of sludge concentrations (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. Any wastes and solutions tha contain residues of substance are disposed in accordance to national and international regulations. 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): PROC10

Assessment method: ECETOC TRA Worker. 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.

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Dermal	27,4 mg/kg bw/day	0,439	PROC10
Worker, long-term, systemic	Inhalation	0,5 mg/m ³	0,167	PROC10
Worker, long-term, systemic	Combined routes	N/A	0,606	PROC10

Environment

Information for contributing scenario (2): ERC2/CEFIC SpERC FEICA 5

Assessment method: EUSES v2.1. Only values calculated for CEFIC SpERC FEICA 5 (selected as the worst case environmental release category) are presented here.

Exposure estimation: (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

<u>Compartment</u>	<u>PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,114 mg/L (a)/0,119 mg/L (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,55 mg/kg dw (a)/1,61 mg/kg dw (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0114 mg/L (a)/0,0119 mg/L (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,155 mg/kg dw (a)/0,161 mg/kg dw (b)	0,878 (a)/0,914 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,256 mg/kg dw (a)/0,0161 mg/kg dw (b)	0,929 (a)/0,0584 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	1,14 mg/L (a)/1,18 mg/L (b)	0,114 (a)/0,118 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

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: Indoor use, without LEV, no respirator required. Duration of activity >4 hours. Exposed skin surface: 480 cm² (two hands, face side only). Concentration of substance: Up to 1% (PROC2, PROC3, PROC4, PROC5, PROC9, PROC10); Up to 100% (PROC8b, PROC14).

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. Maximum daily use at a site: 3636 kg/day (a) / 25455 kg/day (b). Several scenarios are presented which can demonstrate safe use:

- (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment
- (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment
- (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L

Concentration in receiving waters can be calculated using the following equation: Concentration in receiving waters (mg/L) = (daily batch size of sodium benzoate (kg) * 1E+6 * Fraction released to waste water * Fraction of concentration reduction from pre-treatment of aqueous waste * Fraction partitioning in STP to water) / (Flow rate of STP (m³/d) + Flow rate of receiving waters (m³/d) * 1E+3)

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:

SDS Name: Kalama* Sodium benzoate NF/FCC

Sector of use category (SU): SU10

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

Environmental release category (ERC): ERC2/CEFIC SpERC CEPE 1-10

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.

SpERC CEPE 1-10: Formulation of Organic Solvent Borne Coatings and Inks; Formulation of Water Borne Coatings and Inks; Formulation of Powder Coatings and Inks; Formulation of Liquid Coatings and Inks (where specific use not known).

Further explanations:

This emission scenario was based upon CEFIC (European Chemical Industry Council) specific environmental release categories (SpERCs).

Exposure of consumers to substance can be excluded, due to the formulation process being exclusively in an industrial setting.

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: Up to 1% (PROC 1, PROC2, PROC3, PROC5, PROC9); Up to 100% (PROC8b). Physical state: solid.
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration: >4 hours/day. Frequency: Repeated exposure (working life, <=240 days/year; 5 days/week).
Human factors not influenced by risk management:	Exposed skin surface: 480 cm ² (two hands, face side only).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: Not required.
Conditions and measures related to personal protection, hygiene and health evaluation:	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:	All risk management measures utilised must also comply with all relevant local regulations. Several scenarios are presented which can demonstrate safe use: (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L CEPE 6, CEPE 7, CEPE 10 were selected as the worst case environmental release categories.
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Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: solid.
Amounts used:	Maximum daily use at a site: 3600 kg/day (a) / 25333 kg/day (b). Maximum annual use at a site: 810 tons/year (a) / 5700 tons/year (b). Fraction of the main local source: 1. (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
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:	Industry category: 14: Paints, lacquers and varnishes industry. Use category: 55: Others. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0.000097 (CEPE 6, CEPE 7, CEPE 10). Release fraction to wastewater from process: 0.005 (CEPE 6, CEPE 7, CEPE 10). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0 (CEPE 6, CEPE 7, CEPE 10).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).
Conditions and measures related to municipal sewage treatment plant:	Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town). Fraction of emissions degraded in STP: Efficiency=86.5% (a) / Efficiency=98% (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Conditions and measures related to external treatment of waste for disposal:	Not relevant (a) / Sludge is incinerated. Efficiency = 100% reduction of sludge concentrations (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. Any wastes and solutions that contain residues of substance are disposed in accordance to national and international regulations. 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

Assessment method: ECETOC TRA Worker. 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.

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Dermal	13,7 mg/kg bw/day	0,219	PROC5
Worker, long-term, systemic	Inhalation	0,5 mg/m3	0,167	PROC5
Worker, long-term, systemic	Combined routes	N/A	0,386	PROC5

Environment

Information for contributing scenario (2): ERC2/CEFIC SpERC CEPE 6, 7, 10

Assessment method: EUSES v2.1. Only values calculated for CEFIC SpERC CEPE 6, CEPE 7, CEPE10 (selected as the worst case environmental release categories) are presented here.

Exposure estimation: (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

<u>Compartment</u>	<u>PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,113 mg/L (a)/0,118 mg/L (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,53 mg/kg dw (a)/1,6 mg/kg dw (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0113 mg/L (a)/0,0118 mg/L (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

Compartment	PEC	RCR	Notes
Marine water sediment	0,153 mg/kg dw (a)/0,16 mg/kg dw (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,252 mg/kg dw (a)/0,00345 mg/kg dw (b)	0,913 (a)/0,0125 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	1,13 mg/L (a)/1,18 mg/L (b)	0,113 (a)/0,118 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

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: Indoor use, without LEV, no respirator required. Duration of activity >4 hours. Exposed skin surface: 480 cm² (two hands, face side only). Concentration of substance: Up to 1% (PROC 1, PROC2, PROC3, PROC5, PROC9); Up to 100% (PROC8b).

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. Maximum daily use at a site: 3600 kg/day (a) / 25333 kg/day (b). Several scenarios are presented which can demonstrate safe use:

(a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment

(b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment

(c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L

Concentration in receiving waters can be calculated using the following equation: Concentration in receiving waters (mg/L) = (daily batch size of sodium benzoate (kg) * 1E+6 * Fraction released to waste water * Fraction of concentration reduction from pre-treatment of aqueous waste * Fraction partitioning in STP to water) / (Flow rate of STP (m³/d) + Flow rate of receiving waters (m³/d) * 1E+3)

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

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

Environmental release category (ERC): ERC2/CEFIC SpERC CEPE 1-10

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.

SpERC CEPE 1-10: Formulation of Organic Solvent Borne Coatings and Inks; Formulation of Water Borne Coatings and Inks; Formulation of Powder Coatings and Inks; Formulation of Liquid Coatings and Inks (where specific use not known).

Further explanations:

This emission scenario was based upon CEFIC (European Chemical Industry Council) specific environmental release categories (SpERCs).

Exposure of consumers to substance can be excluded, due to the formulation process being exclusively in an industrial setting.

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: Up to 1% (PROC 1, PROC2, PROC3, PROC5, PROC9); Up to 100% (PROC8a, PROC8b). Physical state: liquid (PROC 1, PROC2, PROC3, PROC5, PROC9); solid (PROC8a, PROC8b).
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration: >4 hours/day. Frequency: Repeated exposure (working life, <=240 days/year; 5 days/week).
Human factors not influenced by risk management:	Exposed skin surface: 960 cm ² (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: Not required.
Conditions and measures related to personal protection, hygiene and health evaluation:	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:	All risk management measures utilised must also comply with all relevant local regulations. Several scenarios are presented which can demonstrate safe use: (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L CEPE 6, CEPE 7, CEPE 10 were selected as the worst case environmental release categories.
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: liquid.
Amounts used:	Maximum daily use at a site: 3600 kg/day (a) / 25333 kg/day (b). Maximum annual use at a site: 810 tons/year (a) / 5700 tons/year (b). Fraction of the main local source: 1. (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
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 m ³ /day (default). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Industry category: 14: Paints, lacquers and varnishes industry. Use category: 55: Others. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0.000097 (CEPE 6, CEPE 7, CEPE 10). Release fraction to wastewater from process: 0.005 (CEPE 6, CEPE 7, CEPE 10). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0 (CEPE 6, CEPE 7, CEPE 10).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).

Conditions and measures related to municipal sewage treatment plant: Size of municipal sewage system/treatment plant: ≥ 2000 m³/day (standard town). Fraction of emissions degraded in STP: Efficiency=86.5% (a) / Efficiency=98% (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

Conditions and measures related to external treatment of waste for disposal: Not relevant (a) / Sludge is incinerated. Efficiency = 100% reduction of sludge concentrations (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply: Spills are cleaned immediately. Any wastes and solutions that contain residues of substance are disposed in accordance to national and international regulations. 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

Assessment method: ECETOC TRA Worker. 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.

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Dermal	13,7 mg/kg bw/day	0,219	PROC5, PROC8a
Worker, long-term, systemic	Inhalation	0,5 mg/m ³	0,167	PROC5, PROC8a
Worker, long-term, systemic	Combined routes	N/A	0,386	PROC5, PROC8a

Environment

Information for contributing scenario (2): ERC2/CEFIC SpERC CEPE 6, 7, 10

Assessment method: EUSES v2.1. Only values calculated for CEFIC SpERC CEPE 6, CEPE 7, CEPE10 (selected as the worst case environmental release categories) are presented here.

Exposure estimation: (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

<u>Compartment</u>	<u>PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,113 mg/L (a)/0,118 mg/L (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,53 mg/kg dw (a)/1,6 mg/kg dw (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0113 mg/L (a)/0,00118 mg/L (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,153 mg/kg dw (a)/0,16 mg/kg dw (b)	0,87 (a)/0,91 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,252 mg/kg dw (a)/0,00345 mg/kg dw (b)	0,913 (a)/0,0125 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	1,13 mg/L (a)/1,18 mg/L (b)	0,113 (a)/0,118 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

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: Indoor use, without LEV, no respirator required. Duration of activity >4 hours. Exposed skin surface: 960 cm² (two hands). Concentration of substance: Up to 1% (PROC 1, PROC2, PROC3, PROC5, PROC9); Up to 100% (PROC8a, PROC8b).

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. Maximum daily use at a site: 3600 kg/day (a) / 25333 kg/day (b). Several scenarios are presented which can demonstrate safe use:

(a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment

(b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment

(c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L

Concentration in receiving waters can be calculated using the following equation: Concentration in receiving waters (mg/L) = (daily batch size of sodium benzoate (kg) * 1E+6 * Fraction released to waste water * Fraction of concentration reduction from pre-treatment of aqueous waste * Fraction partitioning in STP to water) / (Flow rate of STP (m3/d) + Flow rate of receiving waters (m3/d) * 1E+3)

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 biocides, 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 biocides, Formulation of pharmaceuticals, Formulation of food

List of use descriptors:

Sector of use category (SU): SU10
Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC14, PROC15
Environmental release category (ERC): ERC2, ERC3

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 Tableting, 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.
ERC3 Formulation into solid matrix.

Further explanations:

Exposure of consumers to substance can be excluded, due to the formulation process being exclusively in an industrial setting.

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: Up to 1% (PROC 1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC9); Up to 100% (PROC8a, PROC8b, PROC14, PROC15). Physical state: solid (Formulation of auxiliary for polymerisation; Formulation of antifreeze and deicing products; Formulation of fillers, putties, plasters, modelling clay; Formulation of pharmaceuticals; Formulation of food); liquid (Formulation of finger paints, Formulation of biocides).
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration: >4 hours/day. Frequency: Repeated exposure (working life, <=240 days/year; 5 days/week).
Human factors not influenced by risk management:	Exposed skin surface: 960 cm ² (two hands).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use.
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: Not required.
Conditions and measures related to personal protection, hygiene and health evaluation:	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:	All risk management measures utilised must also comply with all relevant local regulations. Several scenarios are presented which can demonstrate safe use: (a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment (b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment (c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L ERC2 was selected as the worst case environmental release category.
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: solid (Formulation of auxiliary for polymerisation; Formulation of antifreeze and deicing products; Formulation of fillers, putties, plasters, modelling clay; Formulation of pharmaceuticals; Formulation of food); liquid (Formulation of finger paints, Formulation of biocides).
Amounts used:	Maximum daily use at a site: 917 kg/day (a) / 6667 kg/day (b). Maximum annual use at a site: 275 tons/year (a) / 2000 tons/year (b). Fraction of the main local source: 1. (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
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 m ³ /day (default). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Industry category: 15/0: Others. Use category: 55: Others. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0.025 (ERC2). Release fraction to wastewater from process: 0.02 (ERC2). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0.0001 (ERC2).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).

Conditions and measures related to municipal sewage treatment plant:	Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town). Fraction of emissions degraded in STP: Efficiency=86.5% (a)/ Efficiency=98% (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Conditions and measures related to external treatment of waste for disposal:	Not relevant (a) / Sludge is incinerated. Efficiency = 100% reduction of sludge concentrations (b). (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. Any wastes and solutions tha contain residues of substance are disposed in accordance to national and international regulations. 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): PROC6

Assessment method: ECETOC TRA Worker. 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.

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Dermal	27,4 mg/kg bw/day	0,439	PROC6
Worker, long-term, systemic	Inhalation	0,1 mg/m3	0,0333	PROC6
Worker, long-term, systemic	Combined routes	N/A	0,472	PROC6

Environment

Information for contributing scenario (2): ERC2

Assessment method: EUSES v2.1. Only values calculated for ERC2 (selected as the worst case environmental release category) are presented here.

Exposure estimation: (a) On-site or municipal STP with aerobic treatment; (b) On-site STP with aerobic treatment followed by tertiary ozone treatment.

<u>Compartment</u>	<u>PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,115 mg/L (a)/0,125 mg/L (b)	0,886 (a)/0,958 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,56 mg/kg dw (a)/1,69 mg/kg dw (b)	0,886 (a)/0,958 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0115 mg/L (a)/0,0125 mg/L (b)	0,886 (a)/0,958 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,156 mg/kg dw (a)/0,169 mg/kg dw (b)	0,886 (a)/0,958 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,258 mg/kg dw (a)/0,0147 mg/kg dw (b)	0,936 (a)/0,0535 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	1,15 mg/L (a)/1,24 mg/L (b)	0,115 (a)/0,124 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment

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:	Indoor use, without LEV, no respirator required. Duration of activity >4 hours. Exposed skin surface: 960 cm2 (two hands). Concentration of substance: Up to 1% (PROC 1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC9); Up to 100% (PROC8a, PROC8b, PROC14, PROC15).
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Environment:	<p>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. Maximum daily use at a site: 917 kg/day (a) / 6667 kg/day (b). Several scenarios are presented which can demonstrate safe use:</p> <p>(a) The primary recommended risk management measure is use of an on-site STP or municipal STP with aerobic treatment</p> <p>(b) An alternative risk management measure is to use an on-site STP with aerobic treatment followed by tertiary ozone treatment</p> <p>(c) In the event that neither of the above scenarios is suitable, safe use can be demonstrated when emission to receiving waters is <0.01 mg/L</p> <p>Concentration in receiving waters can be calculated using the following equation: Concentration in receiving waters (mg/L) = (daily batch size of sodium benzoate (kg) * 1E+6 * Fraction released to waste water * Fraction of concentration reduction from pre-treatment of aqueous waste * Fraction partitioning in STP to water) / (Flow rate of STP (m3/d) + Flow rate of receiving waters (m3/d) * 1E+3)</p>
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Exposure scenario (7): Consumer use of cosmetics/personal care products

1. Exposure scenario (7)

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/CEFIC SpERC COLIPA 17-19

Name of contributing environmental scenario and corresponding ERCs:

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

SpERC COLIPA 17-19: Wide Dispersive Use in 'Down the Drain' products - hair and skin care products; Wide Dispersive Use of Aerosol products for hair and skin care (Propellants); Wide Dispersive Use of Aerosol products for hair and skin care (Non-Propellants).

Further explanations:

This emission scenario was based upon CEFIC (European Chemical Industry Council) specific environmental release categories (SpERCs).

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:	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. Assessment of uses of this substance in consumer products has not been performed as there were no end products identified which contain more than 1% of this substance.
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2.2 Control of environmental exposure

General:	All risk management measures utilised must also comply with all relevant local regulations.
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: liquid.
Amounts used:	Total annual EU tonnage of all notifiers: 100,000 tons/year. Total annual EU tonnage of all registrants for use in this application: 10,000 tons/year. Total annual regional tonnage of all registrants for use in this application: 530 tons/year. Fraction of the main local source: 0.00075.
Frequency and duration of use:	Emission days: <=365 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:	Industry category: 5/0: Personal/Domestic use. Use category: 15: Cosmetics. Release fraction to air from process: 1 (ERC8a). Release fraction to wastewater from process: 1 (ERC8a). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0 (ERC8a).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).

Conditions and measures related to municipal sewage treatment plant:

Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).
 Fraction of emissions degraded in STP: Efficiency=86.5%.

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

Discharge of all wastes to a municipal sewage treatment plant (WWTP); or incineration of all waste.
 Any wastes and solutions tha contain residues of substance are disposed in accordance to national and international regulations.
 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

Assessment method: EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,0092 mg/L	0,0708	
Freshwater sediment	0,125 mg/kg dw	0,0708	
Marine water	0,000918 mg/L	0,0706	
Marine water sediment	0,0124 mg/kg dw	0,0706	
Soil	0,0317 mg/kw dw	0,115	
STP	0,0684 mg/L	0,00684	

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.
 Recommended risk management measure: Discharge of all wastes to a municipal sewage treatment plant (WWTP); or incineration of all waste.