

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

1.1. Product identifier:

Product trade name: Purox* B liquid, pure grade benzoic acid
Company product number: BZOHPURB-70
REACH registration number: 01-2119455536-33-0000
Substance name: Benzoic acid liquid
Substance identification number: EC 200-618-2
Other means of identification: Benzenecarboxylic acid; Benzeneformic acid; Phenylcarboxylic acid; Phenylformic acid; Benzenemethanoic acid; Carboxybenzene

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

Uses: Additive. Industrial applications. Professional applications. See Annex for covered uses.

Uses advised against: None identified

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

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

1.4. Emergency telephone number:

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

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

Skin Irritation, category 2, H315
Serious Eye Damage, category 1, H318
STOT, repeated exposure, category 1, H372

2.2. Label elements:

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

Hazard pictogram(s):



Signal word:

Danger

Hazard statements:

H315 Causes skin irritation.
H318 Causes serious eye damage.
H372 Causes damage to organs (lungs) through prolonged or repeated exposure by inhalation.

Precautionary statements:

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

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P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P280 Wear protective gloves/eye protection/face protection.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310 Immediately call a POISON CENTER/doctor.

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:

Product can form a flammable vapor/air mixture at temperatures at or above the flash point. At molten material storage temperatures, explosive vapor-air mixtures may be formed. Vapor of liquid Benzoic Acid sublimates easily forming finely dispersed particles. Heated product causes burns. Potential dust explosion hazard.

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>
000065-85-0	Benzoic Acid	99-100	Eye Dam. 1- Skin Irrit. 2- STOT RE 1	H315-318-372

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Weight%</u>	<u>REACH Registration No.</u>	<u>EC/List Number</u>
000065-85-0	Benzoic Acid	99-100	01-2119455536-33-0000	200-618-2

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

Notes: Benzoic acid: >99%.

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. Get medical attention immediately.

Skin contact: Immediately remove contaminated clothing and shoes. Wash the affected area with plenty of soap and water until no evidence of the chemical remains (at least 15-20 minutes). Launder clothing before reuse. Get medical attention immediately. In case of contact with molten material, get medical attention immediately.

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:

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

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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. Use water/water spray to cool fire exposed containers.

Unsuitable: None known.

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Product can form a flammable vapor/air mixture at temperatures at or above the flash point. Above 120 °C, may form flammable/explosive vapour-air mixture. The storage of molten benzoic acid involves storage of a liquid within its flammable range (at or above the flash point). At molten material storage temperatures, explosive vapor-air mixtures may be formed. Vapor of liquid Benzoic Acid sublimates easily forming finely dispersed particles. Leakage of molten benzoic acid into pipe insulation can cause fire-effects at far lower temperatures than the autoignition temperature. Closed container may rupture (due to build up in pressure) when exposed to extreme heat. Potential dust explosion hazard.

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

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

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

6.2. Environmental precautions:

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

6.3. Methods and material for containment and cleaning up:

Contain by diking with sand, earth or other non-combustible material. Wear proper personal protective clothing and equipment. Absorb spill with an inert material. Place into labeled, closed container; store in safe location to await disposal. Change contaminated clothing and launder before reuse. Allow molten product to cool and harden. Sweep up carefully and place into container for reuse or disposal. Do not sweep or flush product into sewers or waterways.

6.4. References to other sections:

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

SECTION 7: Handling and storage

7.1. Precautions for safe handling:

As with any chemical product, use good laboratory/workplace procedures. Do not cut, puncture, or weld on or near the container. Do not get in eyes, on skin or clothing. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid inhalation of aerosol, mist, spray, fume or vapor. Avoid drinking, tasting, swallowing or ingesting this product. Only use grounded, electrically conductive transfer lines when pneumatically conveying product. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). In general, dust of

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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. Bond, ground and properly vent conveyors, dust control devices and other transfer equipment. 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. Keep away from heat, sparks and open flames. Store this material away from incompatible substances (see section 10). Storage temperatures for the molten material should be kept as low as possible, from 130 - 135°C. 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. Store molten benzoic acid under nitrogen. Storage tank openings should be inspected frequently since benzoic acid can form, clogging the vent openings.

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>
Benzoic Acid	N/E	N/E	N/E	N/E
<u>Chemical Name</u>	<u>UK WEL</u>	<u>Ireland OEL</u>		
Benzoic Acid	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):

Benzoic Acid

<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):

Benzoic Acid

<u>Compartment</u>	<u>PNEC</u>
Freshwater	0,34 mg/L
Freshwater sediment	1,75 mg/kg dw
Marine water	0,034 mg/L
Marine water sediment	0,175 mg/kg dw
Intermittent releases	0,331 mg/L
Soil	0,151 mg/kg dw
STP	100 mg/L
Oral	No potential for bioaccumulation

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

8.2. Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw fumes, vapors and/or 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.).

Individual protection measures, such as personal protective equipment:

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Hand protection: Avoid skin contact when mixing or handling the material by wearing impervious and chemical resistant gloves. In case of prolonged immersion or frequently repeated contact, gloves with breakthrough times greater than 480 minutes (protection class 6) are recommended. For brief contact or splash applications, gloves with breakthrough times of 30 minutes or greater are recommended (protection class 2 or greater). Suggested materials for protective gloves: Butyl rubber, Nitrile rubber, Neoprene, PVC, Viton. Protective gloves insulated against heat. The protective gloves to be used

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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. Dust production: dust mask with filter type P2.

Further information: Extra personal protection including hard hat, rubber over-boots, coveralls, and heat-resistant over-clothing should be used to guard against contact with molten material.

Environmental exposure controls: See Sections 6 and 12.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Form:	Viscous liquid (molten)	pH:	2.8 @ 25°C (saturated solution)
Appearance:	Colorless, Light Yellow	Relative density:	1.06 @ 150°C (Molten)
Odour:	Pungent	Partition coefficient (n-octanol/water):	1.88
Odour threshold:	Not Available	% Volatile by weight:	Not Available
Solubility in water:	3.5 g/L @ 25°C	VOC:	Not Available
Evaporation rate:	Not Available	Boiling point °C:	249 °C @ 760 mm Hg
Vapour pressure:	0.0011 hPa @ 20°C	Boiling point °F:	480 °F @ 760 mm Hg
Vapour density:	4.21 (Air = 1)	Flash point:	121 °C (250 °F)
Viscosity:	1.2 Centipoise @ 130°C	Autoignition temperature:	Not Available
Melting point/Freezing point:	122 °C (252 °F)	Flammability (solid, gas):	Not Applicable (liquid)
Oxidising properties:	Not oxidizing	Flammability or explosive limits:	LFL/LEL: Not Available
Explosive properties:	Not explosive		UFL/UEL: Not Available
Decomposition temperature:	Not Available		

9.2. Other information:

Amounts specified are typical and do not represent a specification.

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

Particle size variation is considered a critical factor in regards to dust explosion hazard information. The Minimum Ignition Energy (MIE) of a dust/air mix depends on the particle size the water content and the temperature of the dust. The finer and the dryer the dust the lower the MIE. The following results are not typical of the product as the test samples were processed by milling and/or sieving prior to testing. Unless specified differently below, the test samples were characterized with particle sizes: 16 um mean (distribution: 99% <75 um, 100% <500 um) and 0.2% moisture content.

- Minimum ignition energy: 1-<3 mJ with inductance, 1-<3 mJ without inductance.
- Minimum explosive concentration: 40-50 g/m³.
- Minimum autoignition temperature (MIT dust cloud): 570°C.
- Maximum rate of pressure rise (dP/dT average): 1039 bars/sec.
- Maximum pressure of explosion (P_{max} average): 8.0 bars-gauge.
- Deflagration Index, K_{st}: 282 bar-m/sec.
- Dust explosion class: St2.
- Volume resistivity (ambient relative humidity): 7.4 x 10⁽⁹⁾ ohm-m (flakes, unknown particle size).
- Volume resistivity (low relative humidity): 1.2 x 10⁽¹²⁾ ohm-m (flakes, unknown particle size).
- Charge decay (ambient relative humidity): 37 seconds (flakes, unknown particle size).
- Charge decay (low relative humidity): 43 seconds (flakes, unknown particle size).

SECTION 10: Stability and reactivity

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10.1. Reactivity:

None known.

10.2. Chemical stability:

This product is stable.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will not occur. Water solutions of product may produce hydrogen gas in contact with aluminum or some other metals.

10.4. Conditions to avoid:

Excessive heat and ignition sources. Avoid static discharge. Avoid dust formation.

10.5. Incompatible materials:

Avoid strong acids, bases, and oxidizing agents. Avoid contact with reducing agents. Avoid contact with metals.

10.6. Hazardous decomposition products:

Carbon dioxide and carbon monoxide, benzene, phenol.

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. Heated product causes burns.

Eyes: Causes serious eye damage.

Skin: Causes skin irritation. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. Heated product causes burns.

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

Ingestion: May be harmful if swallowed. Ingestion may cause irritation. Heated product causes burns.

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>
Benzoic Acid	>12.2 mg/L (4 hours, no mortalities)	Rat/ adult	2250 mg/kg	Mouse	>2000 mg/kg	Rabbit/ adult

Skin corrosion/irritation: Causes skin irritation - Category 2. BENZOIC ACID: Benzoic acid and its salts are capable of causing non-immune immediate contact reactions (NIICR) and non immunogenic contact urticaria (NICU), also known as pseudoallergy. Per definition, non-immunologic immediate contact reactions are considered irritant reactions.

<u>Chemical Name</u>	<u>Skin irritation</u>	<u>Species</u>
Benzoic Acid	Irritant	Guinea pig/Human

Serious eye damage/irritation: Causes serious eye damage - Category 1.

<u>Chemical Name</u>	<u>Eye irritation</u>	<u>Species</u>
Benzoic Acid	Severe irritant	Rabbit/ adult

Respiratory or skin sensitization: Not classified (based on available data, the classification criteria are not met). 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>
Benzoic Acid	Non-sensitizer	Guinea pig and Mouse local lymph node assay

Carcinogenicity: Not classified (based on available data, the classification criteria are not met). READ-ACROSS (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). BENZOIC ACID AND BENZOATE SALTS: Studies of benzoic acid and sodium benzoate in the Ames point mutation assay do not show evidence of mutagenicity. However, some studies have been reported to be positive in the less commonly used Bacillus subtilus

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recombination assay. In a number of cases adverse effects on the chromosome could be noticed, however also negative and/or equivocal results were reported. However many higher-level in vivo tests (clastogenicity inclusive) were negative. Sodium benzoate exhibited no genotoxicity in several in-vivo assays.

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: Causes damage to organs through prolonged or repeated exposure - Category 1. BENZOIC ACID: Repeated dose toxicity study, inhalation: NOAEC (No-Observed-Adverse-Effect-Concentration), inhalation, rat: 250 mg/m³ (systemic effects); 25 mg/m³ (local). Local effects including nasal redness, pulmonary fibrosis and inflammatory cell infiltrates in the lungs were observed at lowest dose of 25 mg/m³. NOAEL (No-Observed-Adverse-Effect-Level), dermal, rabbit - 2500 mg/kg bw/day. READ-ACROSS (SODIUM BENZOATE): Repeated dose oral toxicity studies for salts of benzoic acids: NOAEL (no-observed-adverse-effect-level) 1000 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 (based on available data, the classification criteria are not met).

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>
Benzoic Acid	Fish	LC50 44.6 mg/L (96 hours)	LC50 47.3 mg/L(96 hours)	NOEC >120 mg/L (28 days)
Benzoic Acid	Invertebrates	EC50 >100 mg/L (48 hours)	EC50 102-500 mg/L(24 hours)	NOEC \geq 25 mg/L (21 days)
Benzoic Acid	Algae	EC50 >33.1 mg/L (72 hours)	EC50 168 mg/L(24 hours)	EC10 3.4 mg/L(72 hours)
Benzoic Acid	Micro-organisms	IC50 >1000 mg/L (3 hours)		

12.2. Persistence and degradability:

<u>Chemical Name</u>	<u>Biodegradation</u>
Benzoic Acid	Readily biodegradable

12.3. Bioaccumulative potential:

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

12.4. Mobility in soil:

<u>Chemical Name</u>	<u>Mobility in soil (Koc/Kow)</u>
Benzoic Acid	15.49 (calculated)

12.5. Results of PBT and vPvB assessment:

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

12.6. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

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

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

SECTION 14: Transport information

SDS Name: Purox* B liquid, pure grade benzoic acid

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: UN3256

14.2. UN proper shipping name:

Elevated temperature liquid, flammable, n.o.s. (Benzoic acid)

14.3. Transport hazard class(es):

U.S. DOT hazard class: 3

Canada TDG hazard class: 3

Europe ADR/RID hazard class: 3

IMDG Code (ocean) hazard class: 3

ICAO/IATA (air) hazard class: 3

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

14.4. Packing group: III

14.5. Environmental hazards:

Marine pollutant: Not Applicable

Hazardous substance (USA): A shipment in a single package greater than 5,000 lbs. may exceed the reportable quantity (RQ) for one or more components.

14.6. Special precautions for user:

Not Applicable

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

Not Applicable

SECTION 15: Regulatory information

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

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:

<u>Regulation</u>	<u>Status</u>
Australian Inventory of Industrial Chemicals (AIIC):	Y
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	N
China Inventory of Existing Chemical Substances (IECSC):	Y
European EC Inventory (EINECS, ELINCS, NLP):	Y
Japan Existing and New Chemical Substances (ENCS):	Y
Japan Industrial Safety and Health Law (ISHL):	Y
Korean Existing and Evaluated Chemical Substances (KECL):	Y
New Zealand Inventory of Chemicals (NZIoC):	Y
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Y
Taiwan Inventory of Existing Chemicals:	Y
U.S. Toxic Substances Control Act (TSCA) (Active):	Y

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

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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):

H315 Causes skin irritation.
H318 Causes serious eye damage.
H372 Causes damage to organs through prolonged or repeated exposure.

Reason for revision: Changes in Section(s): 9, 15

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

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
EU OELV: European Union Occupational Exposure Limit Value
EU IOELV: European Union Indicative Occupational Exposure Limit Value
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)

Users Responsibility/Disclaimer of Liability:

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

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

Annex

Exposure Scenarios

Substance information:

Name of substance: Benzoic acid.
EC# 200-618-2 / CAS# 65-85-0
REACH Registration number: 01-2119455536-33-0000

List of exposure scenarios:

ES1: Formulation of cosmetics/personal care products
ES2: Formulation of various products (FECC): Formulation of auxiliary for polymerisation, Formulation of antifreeze and deicing products, Formulation of biocides, Formulation of pharmaceuticals, Formulation of food
ES3: Use as an intermediate
ES4: Use of benzoic acid as an auxiliary for polymerization
ES5: Consumer use of cosmetics/personal care products

General remarks:

Benzoic acid is used as additive in formulation of preparations, as an intermediate to synthesise other substances, and as auxiliary for polymerization processes. Based on current knowledge there are no preparations / formulations which contain benzoic acid in concentrations > 1% (with exception of the use as a laboratory agent) the life cycle ends after the formulation and industrial use stage.
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%.

Exposure scenario (1): Formulation of cosmetics/personal care products

1. Exposure scenario (1)

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 100%. Physical state: liquid.
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

SDS Name: Purox* B liquid, pure grade benzoic acid

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: 5000 kg/day (a) / 34091 kg/day (b). Maximum annual use at a site: 1100 tons/year (a) / 7500 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: 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=87.2% (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.

	Route	Exposure estimate	RCR	Notes
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.

SDS Name: Purox* B liquid, pure grade benzoic acid

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

Compartment	PEC	RCR	Notes
Freshwater	0,32 mg/L (a)/ 0,322 mg/L (b)	0,941 (a)/ 0,946 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,65 mg/kg dw (a)/ 1,66 mg/kg dw (b)	0,941 (a)/ 0,946 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0322 mg/L (a)/ 0,0324 mg/L (b)	0,947 (a)/ 0,952 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,166 mg/kg dw (a)/ 0,167 mg/kg dw (b)	0,947 (a)/ 0,952 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,0246 mg/kg dw (a)/ 0,0136 mg/kg dw (b)	0,163 (a)/ 0,0906 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	3,16 mg/L (a)/ 3,17 mg/L (b)	0,0316 (a)/ 0,0317 (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 100%.

Environment: Maximum daily use at a site: 5000 kg/day (a) / 34091 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 benzoic acid (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 various products (FECC): Formulation of auxiliary for polymerisation, Formulation of antifreeze and deicing products, Formulation of biocides, Formulation of pharmaceuticals, Formulation of food

1. Exposure scenario (2)

Short title of the exposure scenario:

Formulation of various products (FECC): Formulation of auxiliary for polymerisation, Formulation of antifreeze and deicing products, 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.

SDS Name: Purox* B liquid, pure grade benzoic acid

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.
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 100%. Physical state: liquid.
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 ERC2 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: 2500 kg/day (a) / 16667 kg/day (b). Maximum annual use at a site: 750 tons/year (a) / 5000 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 m ³ /day (standard town). Fraction of emissions degraded in STP: Efficiency=87.2% (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): 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	0,434	PROC6
Worker, long-term, systemic	Inhalation	0,1 mg/m ³	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	0,32 mg/L (a)/ 0,315 mg/L (b)	0,941 (a)/ 0,925 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,65 mg/kg dw (a)/ 1,62 mg/kg dw (b)	0,941 (a)/ 0,925 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0322 mg/L (a)/ 0,0317 mg/L (b)	0,947 (a)/ 0,931 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,166 mg/kg dw (a)/ 0,163 mg/kg dw (b)	0,947 (a)/ 0,931 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,0248 mg/kg dw (a)/ 0,0149 mg/kg dw (b)	0,165 (a)/ 0,0992 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	3,16 mg/L (a)/ 3,1 mg/L (b)	0,0316 (a)/ 0,031 (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 100%.

SDS Name: Purox* B liquid, pure grade benzoic acid

Environment: Maximum daily use at a site: 2500 kg/day (a) / 16667 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 benzoic acid (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): Use as an intermediate

1. Exposure scenario (3)

Short title of the exposure scenario:

Use as an intermediate

List of use descriptors:

Sector of use category (SU): SU10

Product category (PC): PC19

Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15

Environmental release category (ERC): ERC6a

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.

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

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.

PROC4 Chemical production where opportunity for exposure arises.

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.

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:

ERC6a Use of intermediate.

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 100%. Physical state: liquid.
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.

SDS Name: Purox* B liquid, pure grade benzoic acid

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
Product characteristics:	Concentration of substance: Up to 100%. Physical state: liquid.
Amounts used:	Maximum daily use at a site: 2500 kg/day (a) / 16667 kg/day (b). Maximum annual use at a site: 750 tons/year (a) / 5000 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 m3/day (default). Dilution factor: 10 (freshwater), 100 (seawater).
Other given operational conditions affecting environmental exposure:	Industry category: 3: Chemical industry - chemicals used in synthesis. Use category: 33: Intermediates. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0.05 (ERC6a). Release fraction to wastewater from process: 0.02 (ERC6a). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0.001 (ERC6a).
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=87.2% (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): 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.

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	13,7 mg/kg bw/day	0,219	PROC8a
Worker, long-term, systemic	Inhalation	0,5 mg/m3	0,167	PROC8a

SDS Name: Purox* B liquid, pure grade benzoic acid

	<u>Route</u>	<u>Exposure estimate</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic	Combined routes	N/A	0,386	PROC8a

Environment

Information for contributing scenario (2): ERC6a

Assessment method: EUSES v2.1.

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	0,32 mg/L (a)/ 0,315 mg/L (b)	0,941 (a) / 0,925 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	1,65 mg/kg dw (a)/ 1,62 mg/kg dw (b)	0,941 (a) / 0,925 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,0322 mg/L (a)/ 0,0317 mg/L (b)	0,947 (a)/ 0,931 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,166 mg/kg dw (a)/ 0,163 mg/kg dw (b)	0,947 (a)/ 0,931 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,025 mg/kg dw (a)/ 0,0162 mg/kg dw (b)	0,166 (a)/ 0,108 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	3,16 mg/L (a)/ 3,1 mg/L (b)	0,0316 (a)/ 0,031 (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 100%.

Environment: Maximum daily use at a site: 2500 kg/day (a) / 16667 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 benzoic acid (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): Use of benzoic acid as an auxiliary for polymerization

1. Exposure scenario (4)

Short title of the exposure scenario:

Use of benzoic acid as an auxiliary for polymerization

List of use descriptors:

Sector of use category (SU): SU10

Product category (PC): PC32

Process category (PROC): PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15

Environmental release category (ERC): ERC6d

Article category (AC): AC13

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.

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

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.

PROC4 Chemical production where opportunity for exposure arises.

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.

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:	
ERC6d Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article).	
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 100%. 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
Product characteristics:	Concentration of substance in product: Up to 1%. Physical state: solid.
Amounts used:	Maximum daily use at a site: 113333 kg/day (a) / 116667 kg/day (b). Maximum annual use at a site: 34000 tons/year (a) / 35000 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: 11: Polymers industry. Use category: 43: Process regulators. Indoor use. Formulating temperature: max 50°C. Release fraction to air from process: 0.35 (ERC6d). Release fraction to wastewater from process: 0.00005 (ERC6d). Release fraction to surface water from process: 0 (EUSES). Release fraction to soil from process: 0.00025 (ERC6d).
Organisational measures to prevent/limit releases from site:	Municipal Sewage Treatment Plant (STP): Yes (freshwater), Yes (marine assessment).

SDS Name: Purox* B liquid, pure grade benzoic acid

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=87.2% (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): 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	PROC8a
Worker, long-term, systemic	Inhalation	0,5 mg/m ³	0,167	PROC8a
Worker, long-term, systemic	Combined routes	N/A	0,386	PROC8a

Environment

Information for contributing scenario (2): ERC6d

Assessment method: EUSES v2.1.

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	0,0397 mg/L (a) / 0,01 mg/L (b)	0,117 (a) / 0,0295 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Freshwater sediment	0,204 mg/kg dw (a) / 0,0516 mg/kg dw (b)	0,117 (a) / 0,0295 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water	0,00417 mg/L (a) / 0,00121 mg/L (b)	0,123 (a) / 0,0355 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Marine water sediment	0,0215 mg/kg dw (a) / 0,00621 mg/kg dw (b)	0,123 (a) / 0,0355 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
Soil	0,138 mg/kg dw (a) / 0,141 mg/kg dw (b)	0,917 (a) / 0,937 (b)	(a) STP with aerobic treatment/(b) STP with aerobic treatment followed by tertiary ozone treatment
STP	0,358 mg/L (a) / 0,0543 mg/L (b)	0,00358 (a) / 0,000543 (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 100%.

SDS Name: Purox* B liquid, pure grade benzoic acid

Environment: Maximum daily use at a site: 113333 kg/day (a) / 116667 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 benzoic acid (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): Consumer use of cosmetics/personal care products

1. Exposure scenario (5)

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.

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: 1,000,000 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=87.2%.

SDS Name: Purox* B liquid, pure grade benzoic acid

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 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

Environment

Information for contributing scenario (2): ERC8a

Assessment method: EUSES v2.1.

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,00892 mg/L	0,0262	
Freshwater sediment	0,046 mg/kg dw	0,0262	
Marine water	0,000889 mg/L	0,0261	
Marine water sediment	0,00458 mg/kg dw	0,0261	
Soil	0,000868 mg/kg dw	0,00576	
STP	0,0688 mg/L	0,000688	

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