Eastman(TM) Benzoic Acid Technical Grade, Flake

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PRD		SDSEU / EN / 0001	

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

1.1 Product identifier

Trade name	:	Eastman(TM) Benzoic Acid Technical Grade, Flake
Product code	:	32645-0F, P32645FG, P32645F2, P32645F5, P32645F8, P32645F1, P32645FA, P32645F4, P32645F3, P32645F9, P32645F7, E32645F1, P32645FC, P32645FD, P32645F0, N32645FG
REACH Registration Number	:	01-2119455536-33-0001
Substance name	:	benzoic acid
EC-No.	:	200-618-2

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

Use of the Substance/Mixture	:	Please refer to the Annex for a listing of uses. Additive
Recommended restrictions on use	:	None known.

1.3 Details of the supplier of the safety data sheet

Company	:	Eastman Chemical Company 200 South Wilcox Drive 37660-5280 Kingsport
Telephone	:	+14232292000
E-mail address of person responsible for the SDS	:	Visit our website at www.EASTMAN.com or email emnmsds@eastman.com

1.4 Emergency telephone number

NCEC +44 (0)1235 239 670

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Skin irritation , Category 2	H315: Causes skin irritation.
Serious eye damage , Category 1	H318: Causes serious eye damage.
Specific target organ toxicity - repeated exposure , Category 1 , Lungs	H372: Causes damage to organs through prolonged or repeated exposure if inhaled.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

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 if inhaled.

Precautionary statements :

Prevention:

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ eye protection/ face protection.

Response:

P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P314 Get medical advice/ attention if you feel unwell.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Substance name : benzoic acid

EC-No. : 200-618-2

Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
benzoic acid	65-85-0	100

	200-618-2	

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled : Remove to fresh air.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.
Get medical advice/ attention.

In case of skin contact : Wash off with soap and water.
Get medical attention if symptoms occur.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
Call a physician or poison control centre immediately.

If swallowed : Seek medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Risks : Causes skin irritation.
Causes serious eye damage.
Causes damage to organs through prolonged or repeated exposure if inhaled.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use water spray to extinguish.
Dry chemical
Carbon dioxide (CO2)

Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Hazardous combustion prod- : No hazardous combustion products are known

ucts

5.3 Advice for firefighters

Special protective equipment for firefighters	:	Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.
Further information	:	Minimize dust generation and accumulation.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Wear appropriate personal protective equipment. Local authorities should be advised if significant spillages cannot be contained.

6.2 Environmental precautions

Environmental precautions	:	Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up	:	Sweep up and shovel into suitable containers for disposal. Prevent runoff from entering drains, sewers, or streams.

6.4 Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Use only with adequate ventilation. Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Do not get in eyes. Do not get on skin or clothing. Wash thoroughly after handling. Minimize dust generation and accumulation.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep tightly closed in a dry, cool and well-ventilated place. Avoid moisture. Keep away from heat and flame. Keep away from direct sunlight.

7.3 Specific end use(s)

Specific use(s)	:	Additive

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
benzoic acid	Workers	Inhalation	Long-term exposure, Systemic effects	3 mg/m3
	Workers	Inhalation	Long-term exposure, Local effects	0,1 mg/m3
	Workers	Inhalation	Long-term exposure, Systemic effects	62,5 mg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
benzoic acid	Water	0,34 mg/l
	Marine water	0,34 mg/l
	Aqua Intermittent	3,3 mg/l
	Sewage Treatment Plant	100 mg/l
	Fresh water sediment	1,75 mg/kg
Remarks:	dry	
	Marine sediment	1,75 mg/kg
	dry	
	Soil	0,151 mg/kg
	dry	

8.2 Exposure controls

Engineering measures

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment

Eye protection : Wear safety glasses with side shields (or goggles).

Hand protection
Remarks : Wear suitable gloves.

Skin and body protection : Any specific clothing information provided is based on published literature and manufacturer data.
Body protection suitability and breakthrough time will differ depending on the specific use conditions.
Clothing to be considered for this material may include sleeves, aprons, pants depending on the use and likelihood of skin contact.
Please refer to the hand protection section for material type.

Respiratory protection : Use respiratory protection unless adequate local exhaust

ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Protective measures : Ensure that eye flushing systems and safety showers are located close to the working place.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	flakes
Colour	:	white
Odour	:	slight, odourless
Odour Threshold	:	not determined
pH	:	2,8 (25 °C)
Melting point/range	:	122,4 °C
Boiling point/boiling range	:	249,2 °C
Flash point	:	Not applicable
Evaporation rate	:	not determined
Upper explosion limit / Upper flammability limit	:	not determined
Lower explosion limit / Lower flammability limit	:	not determined
Vapour pressure	:	0,0011 hPa (20 °C)
Relative vapour density	:	not determined
Relative density	:	1,321 (20 °C)
Solubility(ies)		
Water solubility	:	3,5 g/l (25 °C)
Partition coefficient: n-octanol/water	:	log Pow: 1,88
Auto-ignition temperature	:	not determined
Decomposition temperature	:	Thermal stability not tested. Low stability hazard expected at

normal operating temperatures.

Explosive properties : Not classified

Oxidizing properties : Not classified

9.2 Other information

Surface tension : 67,5 mN/m, 20 °C

Self-ignition : Not applicable

SECTION 10: Stability and reactivity

10.1 Reactivity

None reasonably foreseeable.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : None known.

10.4 Conditions to avoid

Conditions to avoid : Prevent dust accumulation.

10.5 Incompatible materials

Materials to avoid : Strong oxidizing agents

10.6 Hazardous decomposition products

Carbon dioxide (CO2)
Carbon monoxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Components:

benzoic acid:

Acute oral toxicity	:	LD50 Oral (Rat): 2.565 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 12,2 mg/l Exposure time: 4 h Remarks: (highest concentration tested)
Acute dermal toxicity	:	LD50 Dermal (Rabbit): > 2.000 mg/kg Remarks: (highest dose tested)

Skin corrosion/irritation

Causes skin irritation.

Product:

Remarks: No data available

Components:

benzoic acid:

Species: Guinea pig
Exposure time: 24 h
Result: slight

Serious eye damage/eye irritation

Causes serious eye damage.

Product:

Remarks: No data available

Components:

benzoic acid:

Species: Rabbit
Exposure time: 24 h
Result: slight

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Product:

Remarks: No data available

Components:

benzoic acid:

Test Type: Skin Sensitization
Species: Guinea pig
Result: non-sensitizing

Germ cell mutagenicity

Not classified based on available information.

Components:

benzoic acid:

Genotoxicity in vitro : Test Type: Salmonella typhimurium assay (Ames test)
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

Metabolic activation: +/- activation
Method: In vitro Mammalian Chromosome Aberration Test
Result: negative

Genotoxicity in vivo : Species: Rat
Application Route: oral: gavage
Method: Mammalian Bone Marrow Chromosome Aberration Test
Result: negative
Remarks: Read-across from a similar material

Test Type: Mutagenicity
Species: Rat
Application Route: oral: gavage
Method: Genetic Toxicology: Rodent Dominant Lethal Test
Result: negative
Remarks: Read-across from a similar material

Carcinogenicity

Not classified based on available information.

Product:

Remarks: This information is not available.

Components:

benzoic acid:

Species: Rat
Application Route: Ingestion
Remarks: Read-across from a similar material

Reproductive toxicity

Not classified based on available information.

Product:

Effects on fertility : Remarks: No data available

STOT - single exposure

Not classified based on available information.

Product:

Remarks: No data available

STOT - repeated exposure

Causes damage to organs (Lungs) through prolonged or repeated exposure if inhaled.

Product:

Remarks: No data available

Repeated dose toxicity

Components:

benzoic acid:

Species: Rat
NOAEL: 1.000 mg/kg
Application Route: in feed
Exposure time: > 90 d

Species: Rabbit
NOAEL: 2.500 mg/kg
Application Route: Dermal
Exposure time: 21 d

Species: Rat
NOAEL: 0,25 mg/l
Application Route: Inhalation
Exposure time: 20 d

Aspiration toxicity

Not classified based on available information.

Product:

No data available

Information on likely routes of exposure

Product:

Inhalation : Remarks: Causes damage to organs through prolonged or repeated exposure.

Skin contact	:	Remarks: Causes skin irritation.
Eye contact	:	Remarks: Causes serious eye damage.
Ingestion	:	Remarks: None known.

SECTION 12: Ecological information

12.1 Toxicity

Product:

Ecotoxicology Assessment

Chronic aquatic toxicity	:	This product has no known ecotoxicological effects.

Components:

benzoic acid:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill sunfish)): 44,6 mg/l Exposure time: 96 h LC50 (Oncorhynchus mykiss (rainbow trout)): 47,3 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (algae)): > 33,1 mg/l Exposure time: 72 h Test Type: Growth inhibition NOEC: (Chlorella pyrenoidosa (aglae)): 3,4 mg/l Exposure time: 72 h
Toxicity to fish (Chronic toxicity)	:	NOEC:: > 120 mg/l Species: Oncorhynchus mykiss (rainbow trout)
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC:: > 25 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea)

12.2 Persistence and degradability

Components:

benzoic acid:

Biodegradability	:	Concentration: 50 mg/l Result: Readily biodegradable Biodegradation: 89,5 %

Exposure time: 35 d

12.3 Bioaccumulative potential

Components:

benzoic acid:

Bioaccumulation : Remarks: Does not accumulate in organisms.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.

SECTION 14: Transport information

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

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 for product as supplied.

SECTION 15: Regulatory information

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

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	Not applicable
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
Regulation (EC) No 850/2004 on persistent organic pollutants	:	Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
Not applicable

Other regulations:

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

The components of this product are reported in the following inventories:

TSCA	:	On TSCA Inventory
DSL	:	All components of this product are on the Canadian DSL
AICS	:	On the inventory, or in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
ISHL	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

ZW / EN

Annex

Eastman(TM) Benzoic Acid Technical Grade, Flake

150000071528

Contents:

Summary

	Process categories	Product category(ies)	Sector(s) of use	Article (sub) category(ies)	Environmental release category(ies)
Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.	PROC1 PROC2 PROC3 PROC4 PROC5 PROC8b PROC8a PROC9 PROC14 PROC15		SU10		ERC2

Exposure scenario I. Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.

Section 1: Exposure scenario

Sector(s) of use	SU10: Formulation [mixing] of preparations and/or re-packaging

List of names of contributing worker scenarios and corresponding PROCs	PROC1. PROC2. PROC3. PROC4. PROC5. PROC8b. PROC8a. PROC9. PROC14. PROC15.

Name of contributing environmental scenario and corresponding ERC	ERC2

Other Process or activity	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

Section 2: Control of Exposure

Physical form of product:	liquid
Vapour pressure:	0,11 Pa
Process Temperature:	20 °C
Remarks	Not relevant
Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).

2.1. Control of Human Exposure

Other conditions affecting workers exposure				
Area of use	**Room size**	**Temperature**	**Ventilation rate**	**Remarks**
Indoor use	20 m3	25 °C		Liquid, vapour pressure < 0.5 kPa

Frequency and duration of use	**Duration**	**Frequency of use**	**Remarks**
Exposure time	480 min	5 days/week	

Name of contributing exposure scenario	Risk Management Measures
General exposures, Continuous process, no sampling:	Handle substance within a closed system.
General exposures, Continuous process, with sample collection:	Use suitable eye protection and gloves.
General exposures, Use in contained batch processes, with sample collection:	Use suitable eye protection and gloves.
General exposures, General exposures (open systems):	Use suitable eye protection and gloves.
Mixing operations (open systems):	Use suitable eye protection and gloves.
Bulk transfers:	Use suitable eye protection and gloves.
Equipment cleaning and maintenance:	Use suitable eye protection and gloves.
Drum and small package filling:	Use suitable eye protection and gloves.
Production or preparation or articles by tabletting, compression, extrusion or pelletisation:	Use suitable eye protection and gloves.
Laboratory activities:	Use suitable eye protection and gloves.

2.2.Control of environmental exposure

Risk Management Measures	Note: 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.

Technical measures at process level (source) to prevent release	For further specification, refer to section 8 of the SDS.

Organizational measures to prevent/limit release from the site	None

Environment factors not influenced by risk management	
Flow rate of receiving surface water	18.000 m3/d
Local freshwater dilution factor	10
Local marine water dilution factor	100

ERC2: Formulation of preparations

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other legislation.
Water	All waste water must be processed in an onsite or municipal wastewater treatment plant., Prevent environmental discharge consistent with regulatory requirements.

Amounts used: Daily amount per site	5000 kg
Amounts used: Annual amount per site	1100 tonnes/year
Amounts used: Fraction of main source to local environment	1

Msafe	Daily amount per site: 5.000 kg/day

Frequency and duration of use: Continuous process:	220 days/year Emission days

Other given operational conditions affecting environmental exposure

Type:	**Emission days**	**Emission or release factors to the relevant compartments**			**Remarks**
		Air	**Soil**	**Water**	
Continuous release	220	0 %	0 %	1 %	COLIPA spERC 1 -16 were considered for this scenario with COLIPA spERC 8 selected as the worst case environmental release category.

Conditions and measures related to sewage treatment plant	
Municipal sewage treatment plant:	
Discharge rate	2.000 m3/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):87,2 %	

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	**Treatment effectiveness**	**Remarks**
External treatment and disposal of waste should comply with applicable local and/or national regulations.		

Waste Recovery	External recovery and recycling of waste should comply with applicable local and/or national regulations.

Section 3. Exposure estimation and reference to its source

3.1.Health:	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.*

PROC1: Use in closed process, no likelihood of exposure *General exposures, Continuous process, no sampling*

	Exposure level	RCR	Method	Remarks
Inhalation	0,01 mg/m³	0	ECETOC TRA worker V3	
Dermal	1,37 mg/kg/day	0,03	ECETOC TRA worker V3	
combined routes		0,03	ECETOC TRA worker V3	

PROC2: Use in closed, continuous process with occasional controlled exposure *General exposures, Continuous process, with sample collection*

	Exposure level	RCR	Method	Remarks
Inhalation	0,01 mg/m³	0,00333	ECETOC TRA worker V3	
Dermal	1,37 mg/kg/day	0,02	ECETOC TRA worker V3	
combined routes		0,023	ECETOC TRA worker V3	

PROC3: Use in closed batch process (synthesis or formulation) *General exposures, Use in contained batch processes, with sample collection*

	Exposure level	RCR	Method	Remarks
Inhalation	0,1 mg/m³	0,0333	ECETOC TRA worker V3	
Dermal	0,343 mg/kg/day	0,005	ECETOC TRA worker V3	
combined routes		0,0383	ECETOC TRA worker V3	

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises *General exposures, General exposures (open systems)*

	Exposure level	RCR	Method	Remarks
Inhalation	0,5 mg/m³	0,166	ECETOC TRA worker V3	
Dermal	6,86 mg/kg/day	0,11	ECETOC TRA worker V3	
combined routes		0,276	ECETOC TRA worker V3	

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) *Mixing operations (open systems)*

	Exposure level	RCR	Method	Remarks
Inhalation	0,5 mg/m³	0,166	ECETOC TRA worker V3	
Dermal	13,7 mg/kg/day	0,22	ECETOC TRA worker V3	
combined routes		0,386	ECETOC TRA worker V3	

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities *Bulk transfers*

	Exposure level	RCR	Method	Remarks
Inhalation	0,1 mg/m³	0,0333	ECETOC TRA worker V3	
Dermal	27,4 mg/kg/day	0,438	ECETOC TRA worker V3	
combined routes		0,472	ECETOC TRA worker V3	

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities *Equipment cleaning and maintenance*

	Exposure level	RCR	Method	Remarks
Inhalation	0,1 mg/m³	0,0333	ECETOC TRA worker V3	
Dermal	6,86 mg/kg/day	0,11	ECETOC TRA worker V3	
combined routes		0,143	ECETOC TRA worker V3	

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) *Drum and small package filling*

	Exposure level	RCR	Method	Remarks
Inhalation	0,1 mg/m³	0,0333	ECETOC TRA worker V3	
Dermal	0,343 mg/kg/day	0,005	ECETOC TRA worker V3	
combined routes		0,038	ECETOC TRA worker V3	

PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation *Production or preparation or articles by tabletting, compression, extrusion or pelletisation*

	Exposure level	RCR	Method	Remarks
Inhalation	0,1 mg/m³	0,0333	ECETOC TRA worker V3	
Dermal	3,43 mg/kg/day	0,055	ECETOC TRA worker V3	
combined routes		0,0883	ECETOC TRA worker V3	

PROC15: Use as laboratory reagent *Laboratory activities*

	Exposure level	RCR	Method	Remarks
Inhalation	0,1 mg/m³	0,0333	ECETOC TRA worker V3	
Dermal	0,343 mg/kg/day	0,005	ECETOC TRA worker V3	
combined routes		0,038	ECETOC TRA worker V3	

3.2.Environment:	*Used EUSES model. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*

ERC2: Formulation of preparations

Compartment	PEC	Risk characterisation ratio (PEC/PNEC):	Method	Remarks
Water	0,32 mg/l	0,941	EUSES	
Marine water	0,0322 mg/l	0,0947	EUSES	
Freshwater sediment	1,65 mg/kg dwt	0,941	EUSES	
Marine sediment	0,166 mg/kg dwt	0,0947	EUSES	
Soil	0,0246 mg/kg dwt	0,163	EUSES	
Sewage Treatment Plant	3,16 mg/l	0,0316	EUSES	

Section 4 Guidance to check compliance with the exposure scenario

4.1Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency..*
4.2. Environment	*Further details on scaling and control technologies are provided in SPERC factsheet.ries-libraries.html).*

Scaling: The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

mspERC: Substance use rate in spERC
EER,spERC: Efficacy of RMM in spERC
Frelease spERC: Initial release fraction in spERC
DFspERC: dilution factor of STP effluent in river
msite: Substance use rate at site
EER,site: Efficacy of RMM at site
Frelease site: Initial release fraction at site
DFsite: dilution factor of STP effluent in river