para-Xylene

Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Date of issue: 05/10/2011 Revision date:23/05/2017 Supersedes: 18/01/2016 Version: 7

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

1.1. Product identifier

Product form	:	Substance
Trade name	:	para-Xylene
Chemical name	:	p-Xylene
EC index no	:	601-022-00-9
EC no	:	203-396-5
CAS No.	:	106-42-3
REACH registration No.	:	01-2119484661-33
Formula	:	C8H10
Product group	:	Trade product

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

1.2.1. Relevant identified uses

Use of the substance/preparation	:	Manufacture of substances Intermediate Distribution

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Supplier (Only Representative):
Braskem Netherland BV
Weena 238-240, 9th Floor, Tower C
NL - 3012 NJ – Rotterdam

Manufacturer:
Braskem S.A.
Rua Eteno, 1561
Polo Petroquímico de Camaçari
42810-000 – Camaçari – BA – Brasil

productsafety@braskem.com

1.4. Emergency telephone number

Emergency number	:	+31 10 205 2945 (business hours)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Liq. 3	H226
Acute Tox. 4 (Dermal)	H312
Acute Tox. 4 (Inhalation)	H332
Skin Irrit. 2	H315
Eye Irrit. 2	H319
STOT SE 3	H335
Asp. Tox. 1	H304
Aquatic Chronic 3	H412

Full text of H-phrases: see section 16

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08

Signal word (CLP) : Danger

Hazard statements (CLP) : H226 - Flammable liquid and vapour
H304 - May be fatal if swallowed and enters airways
H312 - Harmful in contact with skin
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H332 - Harmful if inhaled
H335 - May cause respiratory irritation
H412 - Harmful to aquatic life with long lasting effects

Precautionary statements (CLP) : P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking
P243 - Take precautionary measures against static discharge
P261 - Avoid breathing dust, fume, gas, mist, vapours, spray
P273 - Avoid release to the environment
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor
P331 - Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P501 - Dispose of contents/container to Comply with applicable local, national and international regulation.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : para-Xylene

CAS No. : 106-42-3

EC no : 203-396-5

EC index no : 601-022-00-9

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
p-Xylene	(CAS No.) 106-42-3 (EC no) 215-535-7 (EC index no) 601-022-00-9	99.7	Flam. Liq. 3, H226 Acute Tox. 4 (Dermal), H312 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 Asp. Tox. 1, H304 Aquatic Chronic 3, H412

Full text of R-, H- and EUH-phrases: see section 16

Synonym: xylenes

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove casualty to fresh air and keep warm and at rest. In case of irregular breathing or respiratory arrest provide artificial respiration. In case of breathing difficulties administer oxygen. Immediately get medical attention.

First-aid measures after skin contact : For even minor contact, immediately remove contaminated clothing. Wash skin thoroughly with mild soap and water. Rinse immediately with plenty of water (for at least 15 minutes). Immediately get medical attention. Discard contaminated clothing.

First-aid measures after eye contact : Rinse immediately and plentifully with water, also under the eyelids, for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately get medical attention.

First-aid measures after ingestion : Remove casualty to fresh air and keep warm and at rest. Do not induce vomiting. If swallowed, rinse mouth with water (only if the person is conscious). Give water to drink if victim completely conscious/alert. Never give anything by mouth to an unconscious person. Immediately get medical attention.

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

Symptoms/injuries : Headache. Nausea. Dizziness. Drowsiness. Loss of consciousness. Vomiting.

Symptoms/injuries after inhalation : Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness. Acute exposure to high doses or chronic exposure can cause pulmonary damages, liver, kidneys and neurological disorders. Aspiration of this material may cause chemical pneumonia.

Symptoms/injuries after skin contact : Causes skin irritation. Prolonged/repetitive skin contact may cause skin defattening or dermatitis. Repeated exposure may cause skin dryness or cracking. Redness. burning.

Symptoms/injuries after eye contact : Irritating to eyes. May cause destruction of eye tissue.

Symptoms/injuries after ingestion : Depression of the central nervous system, headaches, dizziness, drowsiness, loss of co-ordination. Pulmonary oedema.

Chronic symptoms : Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: : carbon dioxide (CO_2), dry chemical powder, foam. Water fog.

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

Fire hazard : Extremely flammable liquid and vapour. Vapours may cause fire/explosion if source of ignition is present. Heavier than air, vapours may travel long distances along ground, ignite and flash back to source. Under fire conditions closed containers may rupture or explode. On combustion forms: Carbon monoxide. Carbon dioxide. Formaldehyde.

Explosion hazard : Vapours can form explosive mixtures with air.

5.3. Advice for firefighters

Firefighting instructions : Do not approach fire except upwind and only with proper skin and respiratory protection (supplied air only). Cool closed containers exposed to fire with water spray.

Protective equipment for firefighters : Extra personal protection: complete protective clothing including self-contained breathing apparatus. In case of fire: Wear self-contained breathing apparatus. Refer to section 8.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Wear suitable protective clothing gloves, and eye/face protection. Refer to section 8.

Emergency procedures : Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. Refer to section 8.

Emergency procedures : Eliminate leaks immediately. Eliminate all ignition sources if safe to do so. Ventilate affected area. do not touch damaged containers or spilled material unless wearing approriate protective clothing.

6.2. Environmental precautions

Use water spray jet to minimise or disperse vapours. Absorb remaining liquid with sand or inert absorbent and remove to safe place. Avoid discharge to the environment. Do not flush down sewers. Do not allow to enter into surface water or drains. Do not allow run-off from fire fighting to enter drains or water courses. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. If the product enters drains or sewers the local water company should be contacted immediately; in the case of contamination of streams, rivers or lakes, the National Rivers Authority.

6.3. Methods and material for containment and cleaning up

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Ventilate affected area.

Methods for cleaning up : Prevent spread over a wide area (e.g. by containment or oil barriers). Collect spills and put it into appropriated container. Keep the recovered product for subsequent recycling.

Other information : Granulated activated charcoal associated to bioremediation demonstrated to be the best remotion system from contaminated water bodies. Recovery of the polluted soil and water remediation can be done through the Fenton reaction.

6.4. Reference to other sections

Refer to sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Use only non-sparking tools. Use grounded electrical/mechanical equipment. Provide earthing of containers, equipment, pumps and ventilation facilities. Ground/bond container and receiving equipment. Avoid producing mist or vapors by heating of opened recipient.

7.2. Conditions for safe storage, including any incompatibilities

Storage condition(s) : Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep in original containers closed. Keep stored the least quantity possible. Store in dry, cool, well-ventilated area.

Incompatible materials : Oxidizing agents. Strong acid. Halogenated compounds.

Packaging materials : stainless steel. carbon steel. PVC.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

p-Xylene (106-42-3)		
EU	IOELV TWA (mg/m³)	221 mg/m³
EU	IOELV TWA (ppm)	50 ppm
EU	IOELV STEL (mg/m³)	442 mg/m³
EU	IOELV STEL (ppm)	100 ppm
EU	Notation	Skin
Austria	MAK (mg/m³)	221 mg/m³
Austria	MAK (ppm)	50 ppm
Austria	MAK Short time value (mg/m³)	442 mg/m³
Austria	MAK Short time value (ppm)	100 ppm
Belgium	Limit value (mg/m³)	221 mg/m³
Belgium	Limit value (ppm)	50 ppm
Belgium	Short time value (mg/m³)	442 mg/m³
Belgium	Short time value (ppm)	100 ppm
Belgium	Remark*	D
France	VLE (mg/m³)	442 mg/m³
France	VLE (ppm)	100 ppm
France	VME (mg/m³)	221 mg/m³
France	VME (ppm)	50 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m³)	440 mg/m³
Germany	TRGS 900 Occupational exposure limit value (ppm)	100 ppm
Germany	TRGS 903 (BGW)	1.5 mg/l Xylol (Blut; Expositionsende bzw. Schichtende) 2 g/l Methylhippur-(Tolur-)säure (Urin; Expositionsende bzw. Schichtende)
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m³)	434 mg/m³
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	100 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (mg/m³)	651 mg/m³
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	150 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	435 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	100 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m3)	655 mg/m³
USA NIOSH	NIOSH REL (STEL) (ppm)	150 ppm
USA OSHA	OSHA PEL (TWA) (mg/m3)	435 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	100 ppm
Spain	VLA-ED (mg/m³)	221 mg/m³
Spain	VLA-ED (ppm)	50 ppm
Spain	VLA-EC (mg/m³)	442 mg/m³
Spain	VLA-EC (ppm)	100 ppm
Switzerland	VLE (mg/m³)	870 mg/m³
Switzerland	VLE (ppm)	200 ppm

p-Xylene (106-42-3)		
Switzerland	VME (mg/m³)	435 mg/m³
Switzerland	VME (ppm)	100 ppm
Switzerland	Remark (CH)	max. 4x30 min/8h
The Netherlands	MAC TGG 8H (mg/m³)	210 mg/m³
The Netherlands	MAC TGG 8H (ppm)	50 ppm
The Netherlands	MAC TGG 15MIN (mg/m³)	442 mg/m³
United Kingdom	WEL TWA (mg/m³)	220 mg/m³
United Kingdom	WEL TWA (ppm)	50 ppm
United Kingdom	WEL STEL (mg/m³)	441 mg/m³
United Kingdom	WEL STEL (ppm)	100 ppm
Czech Republic	Expoziční limity (PEL) (mg/m3)	200 mg/m³
Czech Republic	Expoziční limity (PEL) (ppm)	46 ppm
Czech Republic	Expoziční limity (NPK-P) (mg/m3)	400 mg/m³
Czech Republic	Expoziční limity (NPK-P) (ppm)	92 ppm
Czech Republic	Remark (CZ)	D
Denmark	Grænseværdie (langvarig) (mg/m3)	109 mg/m³
Denmark	Grænseværdie (langvarig) (ppm)	25 ppm
Denmark	Grænseværdie (kortvarig) (mg/m3)	218 mg/m³
Denmark	Grænseværdie (kortvarig) (ppm)	50 ppm
Finland	HTP-arvo (8h) (mg/m3)	220 mg/m³
Finland	HTP-arvo (8h) (ppm)	50 ppm
Finland	HTP-arvo (15 min)	440 mg/m³
Finland	HTP-arvo (15 min) (ppm)	100 ppm
Finland	Huomautus (FI)	iho
Hungary	AK-érték	221 mg/m³
Hungary	CK-érték	442 mg/m³
Ireland	OEL (8 hours ref) (mg/m3)	221 mg/m³
Ireland	OEL (8 hours ref) (ppm)	50 ppm
Ireland	OEL (15 min ref) (mg/m3)	442 mg/m³
Ireland	OEL (15 min ref) (ppm)	100 ppm
Ireland	Notes (IE)	Sk, IOELV
Lithuania	IPRV (mg/m3)	221 mg/m³
Lithuania	IPRV (ppm)	50 ppm
Lithuania	TPRV (mg/m3)	442 mg/m³
Lithuania	TPRV (ppm)	100 ppm
Lithuania	Remark (LT)	O
Norway	Gjennomsnittsverdier (AN) (mg/m3)	108 mg/m³
Norway	Gjennomsnittsverdier (AN) (ppm)	25 ppm
Norway	Merknader (NO)	H("Arbeidstilsynet Nr. 361, 1997, S.22")
Poland	NDS (mg/m3)	100 mg/m³
Poland	NDSCh (mg/m3)	350 mg/m³
Slovakia	NPHV (priemerná) (mg/m3)	221 mg/m³
Slovakia	NPHV (priemerná) (ppm)	50 ppm
Slovakia	Upozornenie (SK)	K
Sweden	nivågränsvärde (NVG) (mg/m3)	200 mg/m³
Sweden	nivågränsvärde (NVG) (ppm)	50 ppm
Sweden	kortidsvärde (KTV) (mg/m3)	450 mg/m³
Sweden	kortidsvärde (KTV) (ppm)	100 ppm
Sweden	Anmärkning (SE)	H

p-Xylene (106-42-3)		
Canada (Quebec)	VECD (mg/m³)	651 mg/m³
Canada (Quebec)	VECD (ppm)	150 ppm
Canada (Quebec)	VEMP (mg/m³)	434 mg/m³
Canada (Quebec)	VEMP (ppm)	100 ppm
Australia	TWA (mg/m³)	441 mg/m³
Australia	TWA (ppm)	100 ppm
Australia	STEL (mg/m³)	662 mg/m³
Australia	STEL (ppm)	150 ppm

p-Xylene (106-42-3)	
DNEL/DMEL (Workers)	
Acute - systemic effects, inhalation	442 mg/m³
Acute - local effects, inhalation	442 mg/m³
Long-term - systemic effects, dermal	3182 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	50 mg/m³/day 221- actual (50 = reference)
Long-term - local effects, inhalation	221 mg/m³/day
DNEL/DMEL (General population)	
Acute - systemic effects, inhalation	260 mg/m³
Acute - local effects, inhalation	260 mg/m³
Long-term - systemic effects,oral	12.5 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	65.3 mg/m³/day
Long-term - systemic effects, dermal	1872 mg/kg bodyweight/day
Long-term - local effects, inhalation	65.3 mg/m³/day
PNEC (Water)	
PNEC aqua (freshwater)	0.25 mg/l
PNEC aqua (marine water)	0.25 mg/l
PNEC aqua (intermittent, freshwater)	0.25 mg/l
PNEC aqua (intermittent, marine water)	0.25 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	14.33 mg/kg dwt
PNEC sediment (marine water)	14.33 mg/kg dwt
PNEC (Soil)	
PNEC soil	2.41 mg/kg dwt
PNEC (Oral)	
PNEC oral (secondary poisoning)	Not applicable
PNEC (STP)	
PNEC sewage treatment plant	5 mg/l

DNEL : 442 mg/m³

PNEC : 0.25 mg/l

8.2. Exposure controls

Appropriate engineering controls : Provide local exhaust or general room ventilation to minimize vapour concentrations. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Personal protective equipment : Protective goggles. Protective clothing. Gloves. Self-contained breathing apparatus.

Hand protection : VITON gloves. protective gloves: neoprene gloves, PVA.

Eye protection : Safety goggles.

Skin and body protection : Use protective coverall. Boots made of PVA.

Respiratory protection : Half/ full mask with filter for organic vapors. If there is any possibility of uncontrolled emissions or entering in instances where the exposure levels are unknown use a full-facepiece positive-pressure, air-supplied respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Colour : Colourless

odour	:	Aromatic
Odour threshold	:	No data available
pH	:	No data available
Relative evaporation rate (butylacetate=1)	:	No data available
Melting point	:	13.2 °C
Freezing point	:	No data available
Boiling point	:	138.4 °C
Flash point	:	25 °C
Relative evaporation rate (diethylether=1)	:	9,9
Self ignition temperature	:	528 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapour pressure	:	8,84 mmHg @ 25°C
Relative vapour density	:	3.7
Relative density	:	0.858 - 0.8611 water at 4° C = 1 (20°C)
Solubility	:	Water: Practically insoluble Soluble in ethanol, acetone
Log Pow	:	3.15
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidising properties	:	No data available
Explosive limits	:	1.1 - 7 vol %

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Avoid static electricity discharges.

10.5. Incompatible materials

Oxidizing agents. strong acids. Halogenated compounds.

10.6. Hazardous decomposition products

Carbon dioxide (CO_2). Carbon monoxide. Formaldehyde.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Harmful in contact with skin. Harmful if inhaled.

p-Xylene (106-42-3)	
LD50 oral rat	3523 mg/kg
LD50 dermal rat	12126 mg/kg
LC50 inhalation rat (mg/l)	27124
ATE (oral)	3523 mg/kg
ATE (dermal)	1100.00000 mg/kg

p-Xylene (106-42-3)	
ATE (dermal)	1100.00000 mg/kg

Skin corrosion/irritation	:	Causes skin irritation.
Serious eye damage/irritation	:	Causes serious eye irritation.
Respiratory or skin sensitisation	:	Not classified
Germ cell mutagenicity	:	Not classified

Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	May be fatal if swallowed and enters airways.

SECTION 12: Ecological information

12.1. Toxicity

p-Xylene (106-42-3)	
LC50 fish 1	2.6 mg/l 96 hours
EC50 Daphnia 1	3.6 mg/l 24 hours
ErC50 (algae)	2.2 mg/l
LOEC (chronic)	3.16 mg/l aquatic invertebrates (21d)
NOEC (acute)	1.57 mg/l aquatic invertebrates (21d)
NOEC (chronic)	> 1.3 mg/l fish (56 d)

12.2. Persistence and degradability

p-Xylene (106-42-3)	
Persistence and degradability	Readily biodegradable. not persistent.
BOD (% of ThOD)	50 % ThOD (13 d)

12.3. Bioaccumulative potential

p-Xylene (106-42-3)	
Log Pow	3.15
Bioaccumulative potential	not bioaccumulative.

12.4. Mobility in soil

p-Xylene (106-42-3)	
Log Koc	118 - 298

12.5. Results of PBT and vPvB assessment

p-Xylene (106-42-3)	
Results of PBT assessment	This substance does not meet the criteria for classification as PBT or vPvB.

12.6. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste)	:	Dispose of contents/container to comply with applicable local, national and international regulations. Consult the appropriate authorities about waste disposal.
Sewage disposal recommendations	:	The adequately treated and biorremediated effluents may be discarded into the water bodies.
Waste disposal recommendations	:	Dispose of this material and its container at hazardous or special waste collection point.

SECTION 14: Transport information

Classification for LAND transport: ADR / RID

14.1 UN Number	:	UN1307
14.2 Proper Shipping Name	:	XYLENES
14.3 Class	:	3
14.4 Packing group	:	III
14.5 Environmental hazards	:	Product considered hazardous to the environment according to available data
14.6 Special precautions for user	:	Hazard Identification Number 30

Classification for SEA transport: IMO - IMDG

14.1 UN Number	:	UN1307

14.2 Proper Shipping Name	: XYLENES
14.3 Class	: 3
14.4 Packing group	: III
14.5 Environmental hazards	: Product considered polluting marine based on available data
14.6 Special precautions for user	: No data available
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:	
Product name	: Xylenes

Classification for AIR transport: IATA - ICAO

14.1 UN Number	: UN1307
14.2 Proper Shipping Name	: Xylenes
14.3 Class	: 3
14.4 Packing group	: III
14.5 Environmental hazards	: Product considered hazardous to the environment according to available data

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product therefore it cannot be considered exhaustive. See guidelines of ADR, RID, IMDG and IATA regulations before transporting the product. The transportation organization is responsible for compliance with laws, regulations and rules for the transport of the material.

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

Contains no REACH candidate substance

Other regulations, restrictions and prohibition regulations : Compliance with following regulations: Directive 1999/45/EC as amended. Directive 67/548/EEC as amended. Regulation (EC) 1272/2008 as amended. Regulation (EC) 1907/2006 as amended.

15.1.2. National regulations

Regional legislation : Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) substances. Listed on the AICS (the Australian Inventory of Chemical Substances). Listed on Inventory of Existing Chemical Substances (IECSC). Listed on the Japanese ENCS (Existing & New Chemicals Substances) inventory. Listed on the Korean ECL (Existing Chemical List) inventory. Listed on New Zealand - Inventory of Chemicals (NZIoC). Listed on Inventory of Chemicals and Chemical Substances (PICCS). Poisonous and Deleterious Substances Control Law. Pollutant Release and Transfer Register Law (PRTR Law).

15.2. Chemical safety assessment

CSA has been established. Exposure scenario is attached.

SECTION 16: Other information

Indication of changes:
Classification of substance has been revised.

Sources of Key data : MSDS.

Abbreviations and acronyms : ACGIH (American Conference of Governement Industrial Hygienists). ASTM - American Society for Testing and Materials . CAS (Chemical Abstracts Service) number. CLP - Classification, Labelling and Packaging. EEC - European Economic Community. EC - European Community. CSR - Chemical Safety Report. GHS - Globally Harmonised System. IARC (International Agency for Research on Cancer). Overland transport (ADR). PVC (Polyvinyl chloride). REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals. SDS - Safety Data Sheet.

Full text of R-, H- and EUH-phrases::

Acute Tox. 4 (Dermal)	Acute toxicity (dermal) Category 4
Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Asp. Tox. 1	Aspiration hazard Category 1
Eye Irrit. 2	Serious eye damage/eye irritation Category 2
Flam. Liq. 3	flammable liquids Category 3
Skin Irrit. 2	skin corrosion/irritation Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H226	Flammable liquid and vapour
H304	May be fatal if swallowed and enters airways
H312	Harmful in contact with skin
H315	Causes skin irritation
H319	Causes serious eye irritation

H332	Harmful if inhaled
H335	May cause respiratory irritation
H412	Harmful to aquatic life with long lasting effects
R10	Flammable.
R20/21	Harmful by inhalation and in contact with skin.
R38	Irritating to skin.
Xi	Irritant
Xn	Harmful

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

1. Exposure scenario ES1

Manufacture

ES Ref.: ES1 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 SU3, SU8, SU9 ERC1, ERC4 ESVOC SPERC 1.1.v1
Processes, tasks, activities covered	Manufacture of substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container). Industrial use
Assessment method	Ecetoc TRA model v2 EUSES model v2.1.1.

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure

Product characteristics

Physical form of product	Liquid, vapour pressure 0,5 - 10 kPa at STP.

Operational conditions

Amounts used	Covers percentage substance in the product up to 100 % (unless stated differently).	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Not applicable	
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently.,Assumes a good basic standard of occupational hygiene is implemented.	

Risk Management Measures

Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.	(general measures for skin irritants)

2.1.2 Contributing scenario controlling worker exposure (PROC1) (Duration: > 4 hours;Without LEV)

PROC1	Use in closed process, no likelihood of exposure

Risk Management Measures

Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.3 Contributing scenario controlling worker exposure (PROC2) (Duration: > 4 hours;Without LEV)

PROC2	Use in closed, continuous process with occasional controlled exposure

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Handle substance within a predominantly closed system provided with extract ventilation.,Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Ensure material transfers are under containment or extract ventilation.	General exposures (closed systems). with sample collection
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.4 Contributing scenario controlling worker exposure (PROC3) (Duration: > 4 hours;Without LEV)

PROC3	Use in closed batch process (synthesis or formulation)

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).	General exposures (closed systems)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.5 Contributing scenario controlling worker exposure (PROC4) (Duration: > 4 hours;Without LEV)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises

Risk Management Measures

Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.6 Contributing scenario controlling worker exposure (PROC8b) (Duration: > 4 hours;Without LEV)

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

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Ensure operatives are trained to minimise exposures.	Process sampling
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.7 Contributing scenario controlling worker exposure (PROC15) (Duration: > 4 hours;Without LEV)

PROC15	Use as laboratory reagent

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Handle in a fume cupboard or under extract ventilation.	Laboratory activities
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.8 Contributing scenario controlling worker exposure (PROC8b) (Duration: > 4 hours;Without LEV)

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

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Clear transfer lines prior to de-coupling.	Bulk transfer (open system)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.9 Contributing scenario controlling worker exposure (PROC8b) (Duration: daily;Without LEV)

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

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Clear transfer lines prior to de-coupling.	Bulk transfer (closed system)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.10 Contributing scenario controlling worker exposure (PROC8a) (Duration: > 4 hours;Without LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Risk Management Measures

Technical conditions and measures to control	Drain down system prior to equipment break-in or	Equipment cleaning and

dispersion from source towards the worker	maintenance.,Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Provide extract ventilation to emission points when contact with warm (> 50°C) lubricant is likely.,Clear spills immediately.	maintenance
Organisational measures to prevent /limit releases, dispersion and exposure	Retain drain downs in sealed storage pending disposal or for subsequent recycle.	Equipment cleaning and maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.11 Contributing scenario controlling worker exposure (PROC2) (Duration: daily;Without LEV)

PROC2	Use in closed, continuous process with occasional controlled exposure

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Avoid dip sampling.,Provide extract ventilation to material transfer points and other openings.	Storage
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.2 Contributing scenario controlling environmental exposure

Assessment method	EUSES model v2.1.1.

Operational conditions		
Amounts used	EU Tonnage (tons/year):	4200000
	Regional use tonnage (tons/year):	600000
	Fraction of main local source	1
Frequency and duration of use	Emission days (days/year):	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	40
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.005
	Release fraction to wastewater from process (initial release prior to RMM):	0.003
	Release fraction to soil from wide dispersive use (regional only):	0.0001

Risk Management Measures		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 90
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93.57
	Soil emission controls are not applicable as there is no direct release to soil.	
	Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	93.57
	Assumed domestic sewage treatment plant flow (m3/d):	10000
Conditions and measures related to external treatment of waste for disposal	During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	During manufacturing no waste of the substance is generated.	

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation: 50 mg/m³/day Dermal: 3182 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method

PROC1 Duration: > 4 hours,Without LEV	0.01	0.000	0.34	0.000	0.000	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC2 Duration: > 4 hours,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC3 Duration: > 4 hours,Without LEV	25	0.5	0.34	0.000	0.500	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC4 Duration: > 4 hours,Without LEV	20	0.4	6.86	0.002	0.402	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: > 4 hours,Without LEV	15	0.3	6.86	0.002	0.302	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC15 Duration: > 4 hours,Without LEV	10	0.2	0.34	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: > 4 hours,Without LEV	15	0.3	6.86	0.002	0.302	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: daily,Without LEV	15	0.3	6.86	0.002	0.302	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8a Duration: > 4 hours,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC2 Duration: daily,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2

3.2. Environment

Information for contributing exposure scenario					
environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.0362	0.25	0.145	EUSES model v2.1.1.
marine water	mg/l	0.0132	0.25	0.053	EUSES model v2.1.1.
freshwater sediment	mg/kg dwt	0.388	14.33	0.027	EUSES model v2.1.1.
Marine water sediment	mg/kg dwt	0.141	14.33	0.010	EUSES model v2.1.1.
Sewage treatment plant	mg/l	1.29	5	0.258	EUSES model v2.1.1.
Soil	mg/kg dwt	0.161	2.41	0.067	EUSES model v2.1.1.

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

4.1. Health

Guidance - Health	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.,Confirm that RMMs and OCs are as described or of equivalent efficiency

4.2. Environment

Guidance - Environment	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.,Confirm that RMMs and OCs are as described or of equivalent efficiency.

1. Exposure scenario ES2

Intermediate

ES Ref.: ES2 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 SU3, SU8, SU9 ERC1, ERC4 ESVOC SPERC 6.1a.v1
Processes, tasks, activities covered	Manufacture of substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container). Industrial use
Assessment method	Ecetoc TRA model v2 EUSES model v2.1.1.

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure

Product characteristics		
Physical form of product	Liquid, vapour pressure 0,5 - 10 kPa at STP.	
Operational conditions		
Amounts used	Covers percentage substance in the product up to 100 % (unless stated differently).	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Not applicable	
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently.,Assumes a good basic standard of occupational hygiene is implemented.	
Risk Management Measures		
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	(general measures for skin irritants)

2.1.2 Contributing scenario controlling worker exposure (PROC1) (Duration: > 4 hours;Without LEV)

PROC1	Use in closed process, no likelihood of exposure

Risk Management Measures		
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.3 Contributing scenario controlling worker exposure (PROC2) (Duration: > 4 hours;Without LEV)

PROC2	Use in closed, continuous process with occasional controlled exposure

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Handle substance within a predominantly closed system provided with extract ventilation.,Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Ensure material transfers are under containment or extract ventilation.	General exposures (closed systems). with sample collection
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.4 Contributing scenario controlling worker exposure (PROC3) (Duration: > 4 hours;Without LEV)

PROC3	Use in closed batch process (synthesis or formulation)

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).	General exposures (closed systems)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.5 Contributing scenario controlling worker exposure (PROC4) (Duration: > 4 hours;Without LEV)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises

Risk Management Measures		
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.6 Contributing scenario controlling worker exposure (PROC8b) (Duration: > 4 hours;Without LEV)

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

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Ensure operatives are trained to minimise exposures.	Process sampling
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.7 Contributing scenario controlling worker exposure (PROC15) (Duration: > 4 hours;Without LEV)

PROC15	Use as laboratory reagent

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Handle in a fume cupboard or under extract ventilation.	Laboratory activities
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.8 Contributing scenario controlling worker exposure (PROC8b) (Duration: > 4 hours;Without LEV)

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

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Clear transfer lines prior to de-coupling.	Bulk transfer (open system)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.9 Contributing scenario controlling worker exposure (PROC8b) (Duration: daily;Without LEV)

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

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Clear transfer lines prior to de-coupling.	Bulk transfer (closed system)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.10 Contributing scenario controlling worker exposure (PROC8a) (Duration: > 4 hours;Without LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance.,Provide a good standard of controlled ventilation (10 to 15 air changes per hour).,Provide extract ventilation to points where emissions occur.	Equipment cleaning and maintenance
Organisational measures to prevent /limit releases,	Retain drain downs in sealed storage pending	Equipment cleaning and

dispersion and exposure	disposal or for subsequent recycle.	maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.11 Contributing scenario controlling worker exposure (PROC2) (Duration: daily;Without LEV)

PROC2	Use in closed, continuous process with occasional controlled exposure

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Avoid dip sampling.,Provide extract ventilation to material transfer points and other openings.	Storage
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4, ESVOC SPERC 6.1a.v1)

ERC1	Manufacture of substances
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ESVOC SPERC 6.1a.v1	Manufacture of substances: Industrial (SU8, SU9)
Assessment method	EUSES model v2.1.1.

Operational conditions		
Amounts used	EU Tonnage (tons/year):	3570000
	Regional use tonnage (tons/year):	357000
	Fraction of main local source	0.01
Frequency and duration of use	Emission days (days/year):	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.005
	Release fraction to wastewater from process (initial release prior to RMM):	0.003
	Release fraction to soil from wide dispersive use (regional only):	0.0001

Risk Management Measures		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 80
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93.57
	Soil emission controls are not applicable as there is no direct release to soil.	
	Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	93.57
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	This substance is consumed during use and no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated.	

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation: 50 mg/m³/day Dermal: 3182 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1 Duration: > 4	0.01	0.000	0.34	0.000	0.000	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2

hours,Without LEV						
PROC2 Duration: > 4 hours,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC3 Duration: > 4 hours,Without LEV	25	0.5	0.34	0.000	0.500	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC4 Duration: > 4 hours,Without LEV	20	0.4	6.86	0.002	0.402	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: > 4 hours,Without LEV	20	0.4	6.86	0.002	0.402	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC15 Duration: > 4 hours,Without LEV	15	0.3	0.34	0.000	0.300	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: > 4 hours,Without LEV	10	0.2	6.86	0.002	0.202	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: daily,Without LEV	15	0.3	6.86	0.002	0.302	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8a Duration: > 4 hours,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC2 Duration: daily,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2

3.2. Environment

Information for contributing exposure scenario					
ERC1, ERC4 ESVOC SPERC 6.1a.v1					
environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.118	0.25	0.472	EUSES model v2.1.1.
marine water	mg/l	0.0117	0.25	0.047	EUSES model v2.1.1.
freshwater sediment	mg/kg dwt	1.26	14.33	0.088	EUSES model v2.1.1.
Marine water sediment	mg/kg dwt	1.26	14.33	0.088	EUSES model v2.1.1.
Sewage treatment plant	mg/l	1.15	5	0.23	EUSES model v2.1.1.
Soil	mg/kg dwt	1.43	2.41	0.593	EUSES model v2.1.1.

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

4.1. Health

Guidance - Health	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.,Confirm that RMMs and OCs are as described or of equivalent efficiency

4.2. Environment

Guidance - Environment	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.,Confirm that RMMs and OCs are as described or of equivalent efficiency.

1. Exposure scenario ES3

Distribution

ES Ref.: ES3 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 SU3, SU8, SU9 ERC1, ERC2 ESVOC SPERC 1.1b.v1
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities. Industrial use
Assessment method	Ecetoc TRA model v2 EUSES model v2.1.1.

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: > 4 hours;Without LEV)

PROC1	Use in closed process, no likelihood of exposure

Product characteristics

Physical form of product	Liquid, vapour pressure 0,5 - 10 kPa at STP.

Operational conditions

Amounts used	Covers percentage substance in the product up to 100 % (unless stated differently).	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Not applicable	
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently.,Assumes a good basic standard of occupational hygiene is implemented.	

Risk Management Measures

Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: > 4 hours;Without LEV)

PROC2	Use in closed, continuous process with occasional controlled exposure

Risk Management Measures

Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.3 Contributing scenario controlling worker exposure (PROC3) (Duration: > 4 hours;Without LEV)

PROC3	Use in closed batch process (synthesis or formulation)

Risk Management Measures

Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.4 Contributing scenario controlling worker exposure (PROC4) (Duration: > 4 hours;Without LEV)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Clear transfer lines prior to de-coupling.	General exposures (open systems). Batch process. with sample collection
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.5 Contributing scenario controlling worker exposure (PROC3) (Duration: > 4 hours;Without LEV)

PROC3	Use in closed batch process (synthesis or formulation)

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Avoid dip sampling.	Process sampling
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.6 Contributing scenario controlling worker exposure (PROC15) (Duration: > 4 hours;Without LEV)

PROC15	Use as laboratory reagent

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Handle in a fume cupboard or under extract ventilation.	Laboratory activities
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.7 Contributing scenario controlling worker exposure (PROC8b) (Duration: > 4 hours;With LEV)

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

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Ensure material transfers are under containment or extract ventilation.,Operate activity away from sources of substance emission or release.,Clear transfer lines prior to de-coupling.	Bulk transfer (closed system)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.8 Contributing scenario controlling worker exposure (PROC8b) (Duration: daily;With LEV)

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

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Ensure material transfers are under containment or extract ventilation.,Operate activity away from sources of substance emission or release.,Clear transfer lines prior to de-coupling.	Bulk transfer (open system)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.9 Contributing scenario controlling worker exposure (PROC9) (Duration: daily;With LEV)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Fill containers/cans at dedicated fill points supplied with local extract ventilation.,Ensure material transfers are under containment or extract ventilation.,Clear transfer lines prior to de-coupling.,Put lids on containers immediately after use.,Clear spills immediately.	Drum and small package filling
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.10 Contributing scenario controlling worker exposure (PROC8a) (Duration: daily;With LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance.,Apply vessel entry procedures including use of supplied compressed air.,Transfer via enclosed lines	Equipment cleaning and maintenance
Organisational measures to prevent /limit releases,	Retain drain downs in sealed storage pending	Equipment cleaning and

dispersion and exposure	disposal or for subsequent recycle.	maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.1.11 Contributing scenario controlling worker exposure (PROC2) (Duration: daily;With LEV)

PROC2	Use in closed, continuous process with occasional controlled exposure

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Store substance within a closed system.,Avoid dip sampling.,Locate bulk storage outdoors.	Storage
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374.	

2.2 Contributing scenario controlling environmental exposure (ERC1, ERC2, ESVOC SPERC 1.1b.v1)

ERC1	Manufacture of substances
ERC2	Formulation of preparations
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)
Assessment method	EUSES model v2.1.1.

Operational conditions		
Amounts used	EU Tonnage (tons/year):	4200000
	Regional use tonnage (tons/year):	600000
	Fraction of main local source	1
Frequency and duration of use	Emission days (days/year):	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.0001
	Release fraction to wastewater from process (initial release prior to RMM):	0.00001
	Release fraction to soil from wide dispersive use (regional only):	0.00001

Risk Management Measures		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ...:	93.57
	Soil emission controls are not applicable as there is no direct release to soil.	
	Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	93.57
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation: 50 mg/m³/day Dermal: 3182 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method

PROC1 Duration: > 4 hours,Without LEV	0.01	0.000	0.34	0.000	0.000	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC2 Duration: > 4 hours,Without LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC3 Duration: > 4 hours,Without LEV	25	0.5	0.34	0.000	0.500	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC4 Duration: > 4 hours,Without LEV	20	0.4	6.86	0.002	0.402	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC3 Duration: > 4 hours,Without LEV	25	0.5	0.34	0.000	0.500	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC15 Duration: > 4 hours,Without LEV	10	0.2	0.34	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: > 4 hours,With LEV	10	0.2	0.69	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8b Duration: daily,With LEV	10	0.2	0.69	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC9 Duration: daily,With LEV	5	0.1	0.69	0.000	0.100	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC8a Duration: daily,With LEV	5	0.1	1.37	0.000	0.100	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2
PROC2 Duration: daily,With LEV	10	0.2	1.37	0.000	0.200	Inhalation.: Ecetoc TRA model v2 Dermal: Ecetoc TRA model v2

3.2. Environment

Information for contributing exposure scenario					
ERC1, ERC2 ESVOC SPERC 1.1b.v1					
environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.0683	0.25	0.273	EUSES model v2.1.1.
marine water	mg/l	0.00676	0.25	0.027	EUSES model v2.1.1.
freshwater sediment	mg/kg dwt	0.733	14.33	0.051	EUSES model v2.1.1.
Marine water sediment	mg/kg dwt	0.0725	14.33	0.005	EUSES model v2.1.1.
Sewage treatment plant	mg/l	0.643	5	0.129	EUSES model v2.1.1.
Soil	mg/kg dwt	0.806	2.41	0.334	EUSES model v2.1.1.

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

4.1. Health

Guidance - Health	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.,Confirm that RMMs and OCs are as described or of equivalent efficiency

4.2. Environment

Guidance - Environment	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.,Confirm that RMMs and OCs are as described or of equivalent efficiency.