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COVER SHEET FOR THE SAFETY DATA SHEET

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Item number: G222

Trade name: Ethyl acetate pure

Supplier:
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Emergency number:
24-hour emergency number: 145
Help with poisoning. Tox Info Suisse provides free medical advice round the clock in cases of poisoning or suspected poisoning.

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SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

ETHYLACETATE 99,5%

Version 3.1 Print Date 24.11.2026

Revision date / valid from 17.08.2023

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

1.1. Product identifier

Trade name	:	ETHYLACETATE 99,5%
Substance name	:	ethyl acetate
Index-No.	:	607-022-00-5
CAS-No.	:	141-78-6
EC-No.	:	205-500-4
EU REACH-Reg. No.	:	01-2119475103-46-xxxx

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

Use of the Substance/Mixture	:	Identified use: See table in front of appendix for a complete overview of identified uses.
Uses advised against	:	At this moment we have not identified any uses advised against
Remarks	:	Before referring to any Exposure Scenario attached to this Safety Data Sheet please check the grade of the product: the Exposure Scenarios presented are not related to all product grade

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag Schweizerhall AG Elsässerstrasse 231 CH 4002 Basel
Telephone	:	+41 (0)58 344 80 00
Telefax	:	+41 (0)58 344 82 08
E-mail address	:	doku@brenntag.ch
Responsible/issuing person	:	Abteilung Produktsicherheit

1.4. Emergency telephone number

Emergency telephone number	:	Swiss Toxicological Information Centre CH-8032 ZÜRICH Tel.: +41 (0) 44 251 51 51 National emergency call: 145

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	**Hazard category**	**Target Organs**	**Hazard statements**
Flammable liquids	Category 2	---	H225
Eye irritation	Category 2	---	H319
Specific target organ toxicity - single exposure	Category 3	Central nervous system	H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health : See section 11 for toxicological information.

Physical and chemical hazards : See section 9/10 for physicochemical information.

Potential environmental effects : See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :



Signal word : Danger

Hazard statements :

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary statements

Prevention :

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243	Take action to prevent static discharges.
P261	Avoid breathing vapours/spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response :

P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue

			rinsing.
Storage	:	P403 + P233	Store in a well-ventilated place. Keep container tightly closed.

Additional Labelling:

EUH066 Repeated exposure may cause skin dryness or cracking.

Hazardous components which must be listed on the label:

• ethyl acetate

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.

Ecological information: No information available about endocrine disruption properties for environment.

Toxicological information: No information available about endocrine disruption properties for human health.

Vapours may form explosive mixture with air.

SECTION 3: Composition/information on ingredients

3.1. Substances

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
ethyl acetate			
Index-No. : 607-022-00-5 CAS-No. : 141-78-6 EC-No. : 205-500-4 EU REACH-Reg. No. : 01-2119475103-46-xxxx	100	Flam. Liq.2 Eye Irrit.2 STOT SE3	H225 H319 H336 EUH066

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	: Remove from exposure, lie down. Take off all contaminated clothing immediately.
If inhaled	: Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. If unconscious place in recovery position. Consult a physician after significant exposure.
In case of skin contact	: Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.
In case of eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 5 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
If swallowed	: Rinse mouth with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. If a person vomits when lying on his back, place him in the recovery position. Call a physician immediately.
Protection of First Aid Responders	: First Aid responders should pay attention to self-protection and use the recommended protective clothing.

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

Symptoms	: Inhalation of high vapour concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting. See Section 11 for more detailed information on health effects and symptoms.
Effects	: See Section 11 for more detailed information on health effects and symptoms.

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, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media	: High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	: The vapour may be invisible, heavier than air and spread along ground. Vapours may form explosive mixtures with air. Flash back possible over considerable distance. The product is insoluble and floats on water.
Hazardous combustion	: Carbon monoxide, Carbon dioxide (CO2)

products

5.3. Advice for firefighters

Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus.Wear personal protective equipment.
Further advice	:	Cool closed containers exposed to fire with water spray.Heating will cause a pressure rise - with risk of bursting.Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Keep away from heat and sources of ignition. Use personal protective equipment. Keep away unprotected persons. Provide adequate ventilation. Avoid contact with skin and eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

Environmental precautions	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling	:	Keep container tightly closed. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
Hygiene measures	:	Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Store in original container. Keep in an area equipped with solvent resistant flooring. Suitable materials for containers: Stainless steel; Unsuitable materials for containers: Aluminium; plastic materials
Advice on protection against fire and explosion	:	Keep away from sources of ignition - No smoking. The vapour may be invisible, heavier than air and spread along ground. Vapours may form explosive mixtures with air. Take measures to prevent the build up of electrostatic charge. Use only in an area containing explosion proof equipment.
Fire-fighting class	:	Highly flammable and extremely fast burning down; Flp < 21°C
Further information on storage conditions	:	Keep tightly closed in a dry and cool place. Keep away from direct sunlight. Keep in a well-ventilated place.
Advice on common storage	:	Incompatible with oxidizing agents. Do not store together with oxidizing and self-igniting products. Keep away from food, drink and animal feedingstuffs.
German storage class	:	3 Flammable liquids

7.3. Specific end use(s)

Specific use(s)	:	Identified use: See table in front of appendix for a complete overview of identified uses.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Component:	**ethyl acetate**	**CAS-No. 141-78-6**
Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)		

DNEL Workers, Long-term - systemic effects, Inhalation	:	734 mg/m3, 200 ppm
DNEL Workers, Acute - systemic effects, Inhalation	:	1468 mg/m3, 400 ppm
DNEL Workers, Long-term - local effects, Inhalation	:	734 mg/m3, 200 ppm
DNEL Workers, Acute - local effects, Inhalation	:	1468 mg/m3, 400 ppm
DNEL Workers, Long-term - systemic effects, Skin contact	:	63 mg/kg bw/day

DNEL Consumers, Long-term - systemic effects, Inhalation	:	367 mg/m3
DNEL Consumers, Acute - systemic effects, Inhalation	:	734 mg/m3, 200 ppm
DNEL Consumers, Long-term - local effects, Inhalation	:	367 mg/m3
DNEL Consumers, Acute - local effects, Inhalation	:	734 mg/m3, 200 ppm
DNEL Consumers, Long-term - systemic effects, Skin contact	:	37 mg/kg bw/day
DNEL Consumers, long-term, Ingestion	:	4,5 mg/kg bw/day

Predicted No Effect Concentration (PNEC)

Fresh water	:	0,24 mg/l
Marine water	:	0,024 mg/l
Intermittent releases	:	1,65 mg/l
Sewage treatment plant (STP)	:	650 mg/l
Fresh water sediment	:	1,15 mg/kg
Marine sediment	:	0,115 mg/kg
Soil	:	0,148 mg/kg
Secondary poisoning	:	200 mg/kg food

Other Occupational Exposure Limit Values

EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended, Time Weighted Average (TWA):
200 ppm, 734 mg/m3
Indicative

EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended, Short Term Exposure Limit (STEL):
400 ppm, 1.468 mg/m3
Indicative

Switzerland. OELs. Limit Values at the Workplace, as per SUVA, as amended, Time Weighted Average (TWA):
200 ppm, 730 mg/m3

Switzerland. OELs. Limit Values at the Workplace, as per SUVA, as amended, Short Term Exposure Limit (STEL):
400 ppm, 1.460 mg/m3

Switzerland. OELs. Limit Values at the Workplace, as per SUVA, as amended
If in compliance with the OEL and BEL values, then there should be no risk of reproductive damage.

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice	:	Required, if exposure limit is exceeded (e.g. OEL). In case of brief exposure or low pollution use breathing filter apparatus. Respiratory protection complying with EN 141. Recommended Filter type:A In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

Advice	:	Protective gloves complying with EN 374. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Protective gloves should be replaced at first signs of wear.
Material	:	butyl-rubber
Break through time	:	>= 1 h
Glove thickness	:	0,5 mm

Eye protection

Advice	:	Safety goggles

Skin and body protection

Advice	:	Solvent resistant protective clothing

Environmental exposure controls

General advice	:	Do not flush into surface water or sanitary sewer system.

Avoid subsoil penetration.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	:	liquid
Physical state	:	liquid
Colour	:	colourless
Odour	:	fruity
Odour Threshold	:	50 ppm
Melting point/range	:	-84 °C
Boiling point/boiling range	:	70 - 78 °C
Flammability (solid, gas)	:	Product is a liquid, see section 9.2.
Upper explosion limit / Upper flammability limit	:	11,5 %(V)
Lower explosion limit / Lower flammability limit	:	2,1 %(V)
Flash point	:	-4 °C
Auto-ignition temperature	:	427 °C (1013 hPa)
Decomposition temperature	:	No data available
Self-Accelerating decomposition temperature (SADT)	:	No data available
pH	:	Not applicable substance/mixture is non-polar/aprotic
Viscosity		
Viscosity, dynamic	:	0,44 mPa.s (20 °C)
Viscosity, kinematic	:	No data available
Flow time	:	No data available
Solubility(ies)		
Water solubility	:	61 g/l (20 °C)
Solubility in other solvents	:	No data available
Dissolution Rate	:	No data available
Partition coefficient: n-octanol/water	:	log Pow: 0,68 (25 °C)
Dispersion Stability	:	No data available
Vapour pressure	:	98,30 hPa (20 °C)

Relative density	:	No data available
Density	:	0,9 g/cm3 (20 °C)
Bulk density	:	No data available
Relative vapour density	:	3,04 (1 bar)

Particle characteristics
No data available

9.2 Other information

Explosives	:	Formation of explosive air/vapour mixtures is possible.
Flammability (liquids)	:	Highly flammable liquid and vapour.
Evaporation rate	:	4,3 (Butyl Acetate = 1)

SECTION 10: Stability and reactivity

10.1. Reactivity

Advice : No decomposition if stored and applied as directed.

10.2. Chemical stability

Advice : Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions : Exothermic reaction with: Strong oxidizing agents Formation of explosive air/vapour mixtures is possible.

10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.
Thermal decomposition : No data available

10.5. Incompatible materials

Materials to avoid : Strong oxidizing agents, Strong acids, Bases, Peroxides, Amines, Alkali metals

10.6. Hazardous decomposition products

Hazardous decomposition products : Acetic acid, Ethanol, Under fire conditions: Carbon oxides

SECTION 11: Toxicological information

11.1. Information on the hazard classes within the meaning of Regulation (EC) No. 1272/2008

Data for the product

Irritation

Skin

Result : Degreases the skin which may cause dry and rough. Prolonged or repeated skin contact may result in dermatitis.

Eyes

Result : Causes serious eye irritation.

Component: ethyl acetate CAS-No. 141-78-6

Acute toxicity

Oral

LD50 : 4934 mg/kg (Rabbit, male and female) (OECD Test Guideline 401)

Inhalation

LC0 : 29,3 mg/l (Rat; 4 h; vapour)

LCLo : > 6000 ppm (Rat, male and female; 6 h; vapour)

Dermal

LD50 : > 20000 mg/kg (Rabbit, male)

Irritation

Skin

Result : No skin irritation (Rabbit) Degreases the skin which may cause dry and rough. Prolonged or repeated skin contact may result in dermatitis.

Eyes

Result : Moderate eye irritation (Rabbit)

Sensitisation

Result : not sensitizing (Maximisation Test; Dermal; Guinea pig) (OECD Test Guideline 406)

CMR effects

CMR Properties

Carcinogenicity	:	Animal testing did not show any carcinogenic effects.
Mutagenicity	:	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects
Reproductive toxicity	:	No toxicity to reproduction

Genotoxicity in vitro

Result	:	negative (Chromosome aberration test in vitro; CHO (Chinese Hamster Ovary) cells; with and without metabolic activation) (OECD Test Guideline 473) negative (Bacterial Reverse Mutation Test; Salmonella typhimurium) (OECD Test Guideline 471)

Genotoxicity in vivo

Result	:	negative (Chromosome aberration test in vivo; Chinese hamster, male and female) (Oral;) (OECD Test Guideline 474)

Specific Target Organ Toxicity

Single exposure

Inhalation	:	Target Organs: Central nervous systemMay cause drowsiness or dizziness.

Repeated exposure

Remarks	:	No data available

Other toxic properties

Repeated dose toxicity

NOAEL	:	900 mg/kg
LOAEL	:	3.600 mg/kg (Rat)(Oral; 90 - 92 d)
NOEC	:	350 ppm (Rat)(Inhalation; 94 d; 5 days/week)
LOEC	:	350 ppm (Rat)(Inhalation; 94 d; 5 days/week)

Aspiration hazard

No aspiration toxicity classification,

11.2. Information on other hazards

Data for the product		
Endocrine disrupting properties		
Assessment	:	No information available about endocrine disruption properties for human health.

Component:	ethyl acetate	CAS-No. 141-78-6
Endocrine disrupting properties		
Assessment	:	No information available about endocrine disruption properties for human health.

SECTION 12: Ecological information

12.1. Toxicity

Component:	ethyl acetate	CAS-No. 141-78-6
Acute toxicity		
Fish		
LC50	:	230 mg/l (Pimephales promelas; 96 h) (flow-through test; US-EPA)
Toxicity to daphnia and other aquatic invertebrates		
EC50	:	610 mg/l (Daphnia magna; 48 h)
EC50		165 mg/l (Daphnia cucullata (water flea); 48 h)
algae		
EC50	:	5600 mg/l (Desmodesmus subspicatus (green algae); 48 h) (static test; End point: Growth rate; DIN 38412)
NOEC		> 100 mg/l (Desmodesmus subspicatus (green algae); 72 h) (static test; End point: Growth rate; OECD Test Guideline 201)
Bacteria		
EC10	:	1650 mg/l (Photobacterium phosphoreum; 15 min) (static test; End point: Growth rate)
EC50		5870 mg/l (Photobacterium phosphoreum; 15 min) (static test; End point: Growth rate)

Chronic toxicity		
Fish		
NOEC	:	> 9,65 mg/l (Pimephales promelas (fathead minnow); 32 d)
Aquatic invertebrates		
NOEC		2,4 mg/l (Daphnia magna (Water flea); 21 d) (semi-static test; OECD Test Guideline 211)

12.2. Persistence and degradability

Data for the product		
Persistence and degradability		
Persistence		
Result	:	The product is insoluble and floats on water. The product evaporates easily from water surface.

Component:	ethyl acetate	CAS-No. 141-78-6
Persistence and degradability		
Persistence		
Result	:	The product evaporates easily from water surface.
Biodegradability		
Result	:	79 % (Related to: Biochemical oxygen demand; Exposure Time: 20 d)(OECD Test Guideline 301D)Readily biodegradable.

12.3. Bioaccumulative potential

Component:	ethyl acetate	CAS-No. 141-78-6
Bioaccumulation		
Result	:	log Kow 0,68 (25 °C)
	:	BCF: 30; (3 d) Bioaccumulation is not expected.

12.4. Mobility in soil

Component:	ethyl acetate	CAS-No. 141-78-6
Mobility		

Water	:	moderately soluble
Air	:	Highly volatile, will partition rapidly to air.

12.5. Results of PBT and vPvB assessment

Data for the product
Results of PBT and vPvB assessment

Result	:	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.

Component:	ethyl acetate	CAS-No. 141-78-6
Results of PBT and vPvB assessment		

Result	:	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent and very bioaccumulating (vPvB).

12.6. Endocrine disrupting properties

Data for the product		
Endocrine disrupting potential	:	No information available about endocrine disruption properties for environment.

Component:	ethyl acetate	CAS-No. 141-78-6
Endocrine disrupting potential	:	No information available about endocrine disruption properties for environment.

12.7. Other adverse effects

Component:	ethyl acetate	CAS-No. 141-78-6
Additional ecological information		

Result	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	:	Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services. This product shall be disposed of or recovered in compliance with

		Directive 2008/98/EC on waste as lastly amended.
Contaminated packaging	:	Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. If recycling is not practicable, dispose of in compliance with local regulations. Do not burn, or use a cutting torch on, the empty drum. Risk of explosion.
European Waste Catalogue Number	:	No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information

14.1. UN number or ID number

1173

14.2. UN proper shipping name

ADR : ETHYL ACETATE
RID : ETHYL ACETATE
IMDG : ETHYL ACETATE

14.3. Transport hazard class(es)

ADR-Class	: 3
(Labels; Classification Code; Hazard Identification Number; Tunnel restriction code)	3; F1; 33; (D/E)
RID-Class	: 3
(Labels; Classification Code; Hazard Identification Number)	3; F1; 33
IMDG-Class	: 3
(Labels; EmS)	3; F-E, S-D

14.4. Packaging group

ADR : II
RID : II
IMDG : II

14.5. Environmental hazards

Environmentally hazardous according to ADR	: no
Environmentally hazardous according to RID	: no
Marine Pollutant according to IMDG-Code	: no

14.6. Special precautions for user

Not applicable.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

Data for the product		
CPID	:	296156-53
Threshold quantity MAO	:	20.000 kg (2015 determined by law SR814.012 Ann. 1 ch. 4)
Ordinance protection of air	:	LRV (CH): chapter 72 - class 3
Ordinance on Chemical Risik Reduction: Annex	:	Annex 1.11: Hazardous liquids
Other regulations	:	Article 4 para. 4 of the Ordinance on the protection of young people in the workplace (SR 822.115) and Article 1 lit. f of the EAER regulation on hazardous work and young people (SR 822.115.2): Young people undergoing basic vocational training may only work with this product if the relevant training ordinance makes provision for them to do so with a view to enabling them to achieve their training objectives and if the preconditions for the training plan have been met and the applicable age restrictions have been complied with. Young people who are not completing any basic vocational training are not permitted to work with this product. Employees of either sex who are under 18 years old are classed as young people.

Component:	**ethyl acetate**	**CAS-No. 141-78-6**
EU. Chemicals Subject to PIC Procedure: Regulation 649/2012/EU on export and import of dangerous chemicals, as amended	:	; The substance/mixture does not fall under this legislation.
EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC)	:	Point Nos.: , 40; Listed Point Nos.: , 3; Listed

Switzerland. VOC Ordinance, Annex I (Substances)	:	Tariff number: 2915.3100

Notification status
ethyl acetate:

Regulatory List	Notification	Notification number
AICS	YES	
VN INVL	YES	
TH INV	YES	2915.31
TH INV	YES	55-1-01777
AU AIICL	YES	
TSCA	YES	
EINECS	YES	205-500-4
DSL	YES	
KECI (KR)	YES	KE-00047
KECI (KR)	YES	97-1-161
ENCS (JP)	YES	(2)-726
PICCS (PH)	YES	
JEX (JP)	YES	(2)-726
ISHL (JP)	YES	(2)-726
NZIOC	YES	HSR001041
IECSC	YES	
INSQ	YES	
ONT INV	YES	
TCSI	YES	

15.2. Chemical safety assessment

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

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Full text of the Notes referred to under section 3.

Abbreviations and Acronyms

AU AIICL	Australia. Industrial Chemicals Act (AIIC) List
BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service

CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
DSL	Canada. Environmental Protection Act, Domestic Substances List
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
ENCS (JP)	Japan. Kashin-Hou Law List
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
IECSC	China. Inventory of Existing Chemical Substances
INSQ	Mexico. National Inventory of Chemical Substances
ISHL (JP)	Japan. Inventory of Industrial Safety & Health
KECI (KR)	Korea. Existing Chemicals Inventory
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NDSL	Canada. Environmental Protection Act. Non-Domestic Substances List
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
NZIOC	New Zealand. Inventory of Chemicals
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
ONT INV	Canada. Ontario Inventory List
PBT	persistent, bioaccumulative and toxic
PHARM (JP)	Japan. Pharmacopoeia Listing
PICCS (PH)	Philippines. Inventory of Chemicals and Chemical Substances
PNEC	predicted no-effect concentration
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
UK REACH Auth. No.:	UK REACH Authorisation Number
UK REACH AuthAppC. No.	UK REACH Authorisation Application Consultation Number
UK REACH-Reg.No	UK REACH Registration Number
STOT	specific target organ toxicity
SPM	Synthetic Polymer Microparticles
SVHC	substance of very high concern

TCSI	Taiwan. Existing Chemicals Inventory
TH INV	Thailand. Existing Chemicals Inventory from FDA
TSCA	US. Toxic Substances Control Act
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
VN INVL	Vietnam. National Chemical Inventory

Further information

Key literature references and sources for data	:	Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
Methods used for product classification	:	The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
Hints for trainings	:	The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
Other information	:	The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

No.	Short title	REACH Auth. No.:/ REACH AuthAppC. No.	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	NA	3	8	NA	1, 2, 8b	1	NA	ES1389
2	Distribution of substance	NA	3	8, 9	NA	1, 2, 8a, 8b, 9, 15	2	NA	ES1393
3	Formulation & (re)packing of substances and mixtures	NA	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 15	2	NA	ES1391
4	Use in coatings	NA	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15, 9, 14	4	NA	ES18795
5	Use in coatings	NA	21	NA	1, 9a	NA	8a	NA	ES1408
6	Use in coatings	NA	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 10, 11, 13, 15, 19	8a, 8d	NA	ES1404
7	Use in cleaning agents	NA	3	NA	NA	2, 3, 4, 7, 8a, 8b, 10, 13	4	NA	ES13890
8	Use in cleaning agents	NA	22	NA	NA	2, 3, 4, 8a, 8b, 10, 11, 13	8a	NA	ES13892
9	Use in agrochemicals	NA	21	NA	27	NA	8a, 8d	NA	ES8754
10	Use in agrochemicals	NA	22	NA	NA	2, 4, 8a, 8b, 11, 13	8a, 8c, 8d, 8f	NA	ES8752
11	Use as lubricants	NA	22	NA	NA	1, 2, 3, 4, 8a, 8b, 9, 10, 11, 13, 17, 18, 20	8a	NA	ES13896
12	Use in laboratories	NA	3	NA	NA	15	4	NA	ES1402
13	Use in laboratories	NA	22	NA	NA	15	8a	NA	ES1406
14	Use as extraction agent and/or processing aid	NA	3	9	NA	1, 2, 3, 4, 8a, 8b	1, 4	NA	ES1395

1. Short title of Exposure Scenario 1: Manufacture of substance		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	
Environmental Release Categories	ERC1: Manufacture of substances	
2.1 Contributing scenario controlling environmental exposure for: ERC1		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual site tonnage	150000 ton(s)/year
	Daily amount per site	500 ton(s)/day
	Fraction used at the main local source.	1
	Annually total	150000 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	2 %
	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	0 %
	Outdoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation, Use appropriate emission abatement equipment from LEV systems if required by local legislation.
	Air	Apply technical measures aiming at reducing releases to air. (Efficiency: > 70 %)
	Water	Onsite wastewater treatment required
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Water	Apply technical measures aiming at reducing and cleaning of wastewater. (Degradation effectiveness: > 87 %)
	Soil	Soil emission controls are not applicable as there is

		no direct release to soil.
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Hazardous waste incineration, Dispose for use in recycled fuels.
	Disposal methods	Dispose of waste product or used containers according to local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	< 240 min(PROC8b)
Human factors not influenced by risk management	Exposed skin area	Two hands face side only. 480 cm²
Other operational conditions affecting workers exposure	Outdoor use	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system.(PROC1)
	General exposures Continuous process With sample collection	Handle substance within a closed system.(PROC2)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extraction ventilation at points where emissions occur. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle.(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

3. Exposure estimation and reference to its source

Environment

ERC1: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Fresh water	PEC	0,1001mg/L	0,385
ERC1	---	Fresh water sediment	PEC	0,1329mg/L	0,475
ERC1	---	Marine water	PEC	0,0099mg/kg	0,384
ERC1	---	Marine sediment	PEC	0,0133mg/kg	0,0474
ERC1	---	Soil	PEC	0,0002mg/kg	0,0011
ERC1	---	Sewage treatment plant (STP)	PEC	0,9724mg/L	0,0015
ERC1	---	Total daily intake via local environment	PEC	0,0025mg/kg bw/day	< 0,001

Workers

PROC8b: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8b	---	Inhalation worker exposure	231,3mg/m³	0,317
PROC8b	---	Dermal worker exposure	6,8mg/kg bw/day	0,108
PROC8b	---	Combined worker exposure	39,9mg/kg bw/day	0,633

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 2: Distribution of substance		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC2: Formulation of preparations	
2.1 Contributing scenario controlling environmental exposure for: ERC2		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual site tonnage	30000 tonnes
	Daily amount per site	100 tonnes
	Fraction used at the main local source.	1
	Annually total	30000 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	2 %
	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	0 %
	Outdoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Containment should be used to minimize releases to air., Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Bund storage facilities to prevent soil and water pollution in the event of spillage.	

	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Hazardous waste incineration, Dispose for use in recycled fuels.
	Disposal methods	Dispose of waste product or used containers according to local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	60 - 240 min(PROC8a)
Human factors not influenced by risk management	Exposed skin area	Two hands 960 cm²
Other operational conditions affecting workers exposure	Outdoor or in highly ventilated (open) spaces	
	Indoor use(PROC8b, PROC9)	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system.(PROC1)
	General exposures Continuous process With sample collection	Handle substance within a closed system.(PROC2)
	Bulk transfers Non-dedicated facility	Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
	Drum/batch transfers Filling/ preparation of equipment from drums or containers. Bulk weighing	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points

		and other openings.(PROC9)
	Laboratory activities	Handle in a fume cupboard or under extract ventilation.(PROC15)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

3. Exposure estimation and reference to its source

Environment

ERC2: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0,179mg/L	0,688
ERC2	---	Marine water	PEC	0,018mg/L	0,688
ERC2	---	Fresh water sediment	PEC	0,239mg/kg	0,854
ERC2	---	Marine sediment	PEC	0,024mg/kg	0,085
ERC2	---	Soil	PEC	0,002mg/kg	0,009
ERC2	---	Sewage treatment plant (STP)	PEC	1,77mg/L	0,003
ERC2	---	Total daily intake via local environment	PEC	0,005mg/kg bw/day	< 0,001

Workers

PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,026mg/m³	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	128,48mg/m³	0,18
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,022
PROC8a	---	Worker - inhalative, long-term - local	385,44mg/m³	0,53
PROC8a	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,044
PROC8b	---	Worker - inhalative, long-term - local	9,91mg/m³	0,014
PROC8b	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC9	---	Worker - inhalative, long-term - local	73,42mg/m³	0,1
PROC9	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC15	---	Worker - inhalative, long-term	50ppm	0,25
PROC15	---	Worker - dermal, long-	0,34mg/kg bw/day	0,005

		term - systemic		

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 3: Formulation & (re)packing of substances and mixtures		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC2: Formulation of preparations	

2.1 Contributing scenario controlling environmental exposure for: ERC2		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual site tonnage	15000 tonnes
	Daily amount per site	50 tonnes
	Fraction used at the main local source.	0,4
	Annually total	60000 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,5 %
	Emission or Release Factor: Water	0,3 %
	Emission or Release Factor: Soil	0,01 %
	Indoor use	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.
	Water	Treat onsite wastewater (prior to receiving water

prevent/limit release from the site		discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Hazardous waste incineration, Dispose for use in recycled fuels., External treatment and disposal of waste should comply with applicable local and/or national regulations.
	Disposal methods	Dispose of waste product or used containers according to local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	< 240 min(PROC8a, PROC8b)
Human factors not influenced by risk management	Exposed skin area	Two hands 960 cm²
Other operational conditions affecting workers exposure	Indoor use	
	Outdoor use(PROC1)	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system.(PROC1)
	General exposures Continuous process With sample collection	Ensure material transfers are under containment or extract ventilation. Provide extraction ventilation at points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC2)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers	Ensure material transfers are under containment or

	Dedicated facility	extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
	Drum/batch transfers Filling/ preparation of equipment from drums or containers. Bulk weighing	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC9)
	General exposures Use in contained batch processes	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC3)
	General exposures Use in contained batch processes With sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC4)
	Mixing operations (open systems) Batch process	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC5)
	Laboratory activities	Handle in a fume cupboard or under extract ventilation.(PROC15)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

3. Exposure estimation and reference to its source

Environment

ERC2: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0,144mg/L	0,554
ERC2	---	Marine water	PEC	0,0144mg/L	0,554
ERC2	---	Fresh water sediment	PEC	0,192mg/kg	0,686
ERC2	---	Marine sediment	PEC	0,019mg/kg	0,0685
ERC2	---	Soil	PEC	0,0015mg/kg	0,005
ERC2	---	Sewage treatment plant (STP)	PEC	1,416mg/L	0,0022
ERC2	---	Total daily intake via local environment	PEC	0,003mg/kg bw/day	< 0,001

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,03mg/m³	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	18,35mg/m³	0,025
PROC2	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,0022
PROC3	---	Worker - inhalative, long-term - local	73,42mg/m³	0,10
PROC3	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	< 0,001
PROC4	---	Worker - inhalative, long-term - local	73,42mg/m³	0,25
PROC4	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC5	---	Worker - inhalative, long-term - local	183,54mg/m³	0,301
PROC5	---	Worker - dermal, long-term - systemic	0,07mg/kg bw/day	0,0011
PROC8a	---	Worker - inhalative, long-term - local	55,06mg/m³	0,075
PROC8a	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	33,04mg/m³	0,075
PROC8b	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC9	---	Worker - inhalative, long-term - local	73,42mg/m³	0,10
PROC9	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC15	---	Worker - inhalative, long-term	50ppm	0,25
PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,005

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 4: Use in coatings	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 100%
Amount used	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,05
	Annually total	60000 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	98 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0 %
	Indoor use	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to	Air	Use containment measures to reduce fugitive emissions. (Efficiency: > 80 %)
	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation, Use appropriate emission abatement equipment from LEV systems if required by local

prevent/limit release from the site		legislation., Use of technical measures such as catalytic or thermal oxidation to reduce emissions to air.
	Water	Onsite wastewater treatment required, If discharging to domestic sewage treatment plant, no secondary wastewater treatment required., Do not release wastewater directly into environment.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 88 %)
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Treat all waste as hazardous waste
	Disposal methods	Hazardous waste incineration, Dispose of waste or used sacks/containers according to local regulations. (Efficiency: 99,98 %)
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	> 100 hPa
Frequency and duration of use	Frequency of use	8 hours/day
Other operational conditions affecting workers exposure	Indoor use	
Technical conditions and measures to control dispersion from source towards the worker	General exposures	Handle substance within a closed system.(PROC1)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
	Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing	Use ventilation to extract vapours from freshly coated articles/objects.(PROC2)
	Film formation - air drying	Use ventilation to extract vapours from freshly

		coated articles/objects.(PROC4)
	Provide extract ventilation to points where emissions occur.(PROC5)	
	Carry out in a vented booth or extracted enclosure.(Automatic/robotic PROC7)	
	Carry out in a vented booth or extracted enclosure.(Manual PROC7)	
	Provide extract ventilation to material transfer points and other openings.(PROC8a)	
	Ensure material transfers are under containment or extract ventilation.(PROC8b)	
	Indoor	Provide extract ventilation to points where emissions occur.(PROC10)
	Indoor	Provide extract ventilation to points where emissions occur.(PROC13)
	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.(PROC14)	
Organisational measures to prevent /limit releases, dispersion and exposure	Bulk transfers Non-dedicated facility	If technical measures not practical: Avoid carrying out operation for more than 1 hour.(PROC8a)
	Bulk transfers Dedicated facility	If technical measures not practical: Avoid carrying out operation for more than 1 hour.(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Butyl rubber gloves offer good protection	
	Wear respiratory protection Wear face protection. Wear a full face respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily.(Manual PROC7)	
	With Local Exhaust Ventilation	(Efficiency: 90 %)(PROC2, PROC5, PROC8a, PROC9, PROC13, PROC14)
	With Local Exhaust Ventilation	(Efficiency: 95 %)(PROC7)
	With Local Exhaust Ventilation	(Efficiency: 97 %)(PROC8b)

3. Exposure estimation and reference to its source

Environment

ERC4: ECETOC TRA

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water sediment	PEC	0,718mg/kg dry weight (d.w.)	---
ERC4	---	Marine water	PEC	0,012mg/L	---
ERC4	---	Marine sediment	PEC	0,0719mg/kg dry weight (d.w.)	---
ERC4	180 days	Soil	PEC	0,0413mg/kg dry weight (d.w.)	---
ERC4	30 days	Soil	PEC	0,082mg/kg dry weight (d.w.)	---

ERC4	180 days	Grassland	PEC	0,0435mg/kg dry weight (d.w.)	---
ERC4	Annual average	Air	PEC	0,224mg/m³	---

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	General exposures (closed systems)	Inhalation worker exposure	0,01ppm	< 0,001
PROC1	General exposures (closed systems)	Dermal worker exposure	0,03mg/kg bw/day	< 0,001
PROC2	General exposures (closed systems), Use in contained systems, With sample collection	Inhalation worker exposure	25ppm	0,125
PROC2	General exposures (closed systems), Use in contained systems, With sample collection	Consumer dermal exposure	1,3mg/kg bw/day	0,022
PROC2	Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing	Inhalation worker exposure	12,5ppm	0,063
PROC2	Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing	Dermal worker exposure	1,3mg/kg bw/day	0,022
PROC3	Mixing operations, General exposures	Inhalation worker exposure	50ppm	0,25
PROC3	Mixing operations, General exposures	Dermal worker exposure	0,69mg/kg bw/day	0,011
PROC4	Film formation - air drying	Inhalation worker exposure	10ppm	0,05
PROC4	Film formation - air drying	Dermal worker exposure	6,8mg/kg bw/day	0,109
PROC5	Preparation of material for application, Mixing operations (open systems)	Inhalation worker exposure	25ppm	0,125
PROC5	Preparation of material for application, Mixing operations (open systems)	Dermal worker exposure	14mg/kg bw/day	0,218
PROC7	Spraying (automatic/robotic)	Inhalation worker exposure	25ppm	0,125
PROC7	Spraying (automatic/robotic)	Dermal worker exposure	43mg/kg bw/day	0,68
PROC7	Spraying	Inhalation worker exposure	25ppm	0,125
PROC7	Spraying	Dermal worker exposure	43mg/kg bw/day	0,68
PROC8a	Non-dedicated facility	Dermal worker exposure	14mg/kg bw/day	0,218
PROC8a	Non-dedicated facility	Inhalation worker	25ppm	0,125

		exposure		
PROC8b	Material transfers, Dedicated facility	Dermal worker exposure	14mg/kg bw/day	0,218
PROC8b	Material transfers, Dedicated facility	Inhalation worker exposure	4,5ppm	0,023
PROC10	Roller, spreader, flow application	Dermal worker exposure	27mg/kg bw/day	0,435
PROC10	Roller, spreader, flow application	Inhalation worker exposure	25ppm	0,125
PROC13	Dipping, immersion and pouring	Dermal worker exposure	14mg/kg bw/day	0,218
PROC13	Dipping, immersion and pouring	Inhalation worker exposure	25ppm	0,125
PROC15	Laboratory activities	Dermal worker exposure	0,34mg/kg bw/day	0,005
PROC15	Laboratory activities	Inhalation worker exposure	50ppm	0,25
PROC9	Material transfers, Drum/batch transfers, Transfer from/pouring from containers	Inhalation worker exposure	20ppm	0,1
PROC9	Material transfers, Drum/batch transfers, Transfer from/pouring from containers	Dermal worker exposure	6,8mg/kg bw/day	0,109
PROC14	Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Dermal worker exposure	3,4mg/kg bw/day	0,054
PROC14	Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Inhalation worker exposure	25ppm	0,125

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

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.
Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

1. Short title of Exposure Scenario 5: Use in coatings		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC1: Adhesives, sealants PC9a: Coatings and paints, thinners, paint removers	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Annual amount per site	500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	90 %
	Emission or Release Factor: Water	90 %
	Emission or Release Factor: Soil	0 %
	Indoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Degradation efficiency	70 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of empty containers and wastes safely.
2.2 Contributing scenario controlling consumer exposure for: PC1: Glues, hobby use		
Activity	spray application	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	60 min
Human factors not influenced by risk management	Exposed skin area	Covers skin contact area up to 35 cm²

Other given operational conditions affecting consumers exposure	Room size	20 m3
2.3 Contributing scenario controlling consumer exposure for: PC1: Glues DIY-use (carpet glue, tile glue, wood parquet glue)		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	60 min
Human factors not influenced by risk management	Exposed skin area	Covers skin contact area up to 110 cm²
Other given operational conditions affecting consumers exposure	Room size	20 m3
2.4 Contributing scenario controlling consumer exposure for: PC9a: Solvent rich, high solid, water borne paint		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	60 min
Human factors not influenced by risk management	Exposed skin area	Covers skin contact area up to 428 cm²
Other given operational conditions affecting consumers exposure	Room size	20 m3
2.5 Contributing scenario controlling consumer exposure for: PC9a: Aerosol spray can		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	25 min
Human factors not influenced by risk management	Exposed skin area	Covers skin contact area up to 428 cm²
Other given operational conditions affecting consumers	Room size	20 m3

exposure

3. Exposure estimation and reference to its source

Environment

ERC8a: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0,0044mg/L	0,017
ERC8a	---	Marine water	PEC	0,0004mg/L	0,017
ERC8a	---	Fresh water sediment	PEC	0,0059mg/kg	0,021
ERC8a	---	Marine sediment	PEC	0,0005mg/kg	0,002
ERC8a	---	Soil	PEC	0,0001mg/kg	< 0,001
ERC8a	---	Sewage treatment plant (STP)	PEC	0,0161mg/L	< 0,001
ERC8a	---	Total daily intake via local environment	PEC	0,0001mg/kg bw/day	< 0,001

Consumers

PC1, PC9a: Solvent rich, high solid, water borne paint, PC9a: Aerosol spray can: ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC1	---	Consumer inhalation exposure	29,9mg/m³	0,245
PC1	---	Consumer dermal exposure	0,04mg/kg bw/day	0,00108
PC9a: Solvent rich, high solid, water borne paint	---	Consumer inhalation exposure	0,03mg/m³	0,000246
PC9a: Solvent rich, high solid, water borne paint	---	Consumer dermal exposure	0,02mg/kg bw/day	0,000541
PC9a: Aerosol spray can	---	Consumer inhalation exposure	1,3mg/m³	0,0107
PC9a: Aerosol spray can	---	Consumer dermal exposure	0,02mg/kg bw/day	0,000541

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

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
For further information on the assessment method, see:
http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

1. Short title of Exposure Scenario 6: Use in coatings		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	5000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	90 %
	Emission or Release Factor: Water	90 %
	Emission or Release Factor: Soil	0 %
	Indoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient temperature	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)

	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
	Disposal methods	Dispose of waste product or used containers according to local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid, spray aerosol
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	8 hours/day
Human factors not influenced by risk management	Exposed skin area	Hands and forearms. 1500 cm²
Other operational conditions affecting workers exposure	Indoor use	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Clear spills immediately. Ensure operation is undertaken outdoors.(PROC1)
	General exposures Continuous process With sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC2)
	Preparation of material for application	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system.(PROC3)
	Film formation - air drying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Use ventilation to extract vapours from freshly coated articles/objects. Limit the substance content in the product to 20 %.(PROC4)
	Preparation of material for application	Ensure operation is undertaken outdoors.(PROC5)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Use drum pumps or carefully pour from container. Locate bulk storage outdoors. Clear spills immediately.(PROC8a)
	Bulk transfers	Ensure material transfers are under containment or

	Dedicated facility	extract ventilation. Provide extract ventilation to points where emissions occur. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors. Clear spills immediately.(PROC8b)
	Roller, spreader, flow application Cleaning Machines Manual	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC10)
	Treatment by dipping and pouring Machines Manual	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC13)
	Spraying/ fogging by manual application with potential for aerosol generation	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Ensure that a spraying booth is used. Clear spills immediately.(PROC11)
	Laboratory activities	No general ventilation necessary(PROC15)
	Transfer from/pouring from containers Mixing operations Manual Without Local Exhaust Ventilation Indoor	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC19)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily.(PROC5)	
	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A filter or better.	
	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

3. Exposure estimation and reference to its source

Environment

ERC8a, ERC8d: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a, ERC8d	---	Fresh water	PEC	0,139mg/L	0,535
ERC8a, ERC8d	---	Marine water	PEC	0,014mg/L	0,535
ERC8a, ERC8d	---	Fresh water sediment	PEC	0,186mg/kg	0,664
ERC8a, ERC8d	---	Marine sediment	PEC	0,019mg/kg	0,066
ERC8a, ERC8d	---	Soil	PEC	0,0002mg/kg	< 0,001
ERC8a, ERC8d	---	Sewage treatment plant (STP)	PEC	1,369mg/L	0,002
ERC8a, ERC8d	---	Total daily intake via local	PEC	0,003mg/kg bw/day	< 0,001

		environment			

Workers

PROC1, PROC2, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,154mg/m³	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,342mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	22,03mg/m³	0,03
PROC2	---	Worker - dermal, long-term - systemic	0,137mg/kg bw/day	0,0022
PROC8a	---	Worker - inhalative, long-term - local	44,05mg/m³	0,06
PROC8a	---	Worker - dermal, long-term - systemic	0,137mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	11,01mg/m³	0,015
PROC8b	---	Worker - dermal, long-term - systemic	0,686mg/kg bw/day	0,011
PROC10	---	Worker - inhalative, long-term - local	132,15mg/m³	0,18
PROC10	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,022
PROC11	---	Worker - inhalative, long-term - local	264,3mg/m³	0,36
PROC11	---	Worker - dermal, long-term - systemic	2,14mg/kg bw/day	0,034
PROC13	---	Worker - inhalative, long-term - local	66,08mg/m³	0,091
PROC13	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC19	---	Worker - inhalative, long-term - local	220,25mg/m³	0,30
PROC19	---	Worker - dermal, long-term - systemic	28,28mg/kg bw/day	0,45

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 7: Use in cleaning agents		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC4		
Amount used	Annual amount per site	25 ton(s)/year
	Daily amount per site	1200 kg/day
Frequency and duration of use	Continuous exposure	20 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	30 %
	Emission or Release Factor: Water	0,01 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treat air emission to provide a typical removal efficiency of (%):
	Water	Do not release wastewater directly into environment., Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):, If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.
	Soil	Soil emission controls are not applicable as there is no direct release to soil.
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements. Adequate closed storage facilities (e.g., bulk storage tanks, intermediate bulk containers, drums) for VOC-containing raw materials.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Degradation efficiency	88 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	> 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Use in contained batch processes Treatment by heating	Provide extract ventilation to points where emissions occur.(PROC4)
	Filling/ preparation of equipment from drums or containers.	Ensure material transfers are under containment or extract ventilation. Clear transfer lines prior to de-coupling.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Clear transfer lines prior to de-coupling.(PROC8b)
	Cleaning with low-pressure washers	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC10)
	Manual Surfaces Cleaning no spraying	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC10)
	Degreasing small objects in cleaning station	Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC13)
Conditions and measures related to personal protection, hygiene and health evaluation	Cleaning with high pressure washers	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily.(PROC7)
	Cleaning with low-pressure washers	Wear a respirator conforming to EN140 with Type A filter or better.(PROC10)
	Manual Surfaces Cleaning no spraying	Wear a respirator conforming to EN140 with Type A filter or better.(PROC10)

3. Exposure estimation and reference to its source

Environment

ERC4: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC - local	0,00117mg/L	0,0045
ERC4	---	Fresh water sediment	PEC - local	0,00698mg/kg dry weight (d.w.)	0,00558
ERC4	---	Marine water	PEC - local	0,000132mg/L	0,00508
ERC4	---	Marine sediment	PEC - local	0,000784mg/kg dry weight (d.w.)	0,00627

ERC4	---	Soil	PEC - local	0,00114mg/kg dry weight (d.w.)	0,00691
ERC4	---	Sewage treatment plant (STP)	PEC	0,0625mg/L	0,000096
ERC4	---	---	Msafe	173000kg/day	---

ESVOC spERC 4.4a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC8a, PROC13	---	Inhalation worker exposure	25ppm	0,125
PROC2, PROC8a, PROC13	---	Dermal worker exposure	1,371mg/kg/day	0,022
PROC3, PROC4, PROC7	---	Inhalation worker exposure	50ppm	0,25
PROC3, PROC4, PROC8b	---	Dermal worker exposure	0,686mg/kg/day	0,011
PROC7	---	Dermal worker exposure	42,86mg/kg/day	0,68
PROC8b	---	Inhalation worker exposure	4,5ppm	0,023
PROC10	---	Inhalation worker exposure	75ppm	0,375
PROC10	---	Dermal worker exposure	27,43mg/kg/day	0,435

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

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
The following equation may be used for scaling:

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

Where: mspERC: Substance use rate in spERC
EER,spERC: Efficacy of RMM in spERC
Frelease,spERC: Initial release fraction in spERC
DFspERC: spERC wastewater dilution factor

Msite: Substance use rate at site
EER,site: Efficacy of RMM at site
Frelease,site: Initial release fraction at site
DFsite: site-specific wastewater dilution factor
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 8: Use in cleaning agents		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a		
Amount used	Annual amount per site	0,005 ton(s)/year
	Daily amount per site	0,013 kg/day
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	Emission or Release Factor: Water	100 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Soil	Soil emission controls are not applicable as there is no direct release to soil.
	Prevent environmental discharge consistent with regulatory requirements. Adequate closed storage facilities (e.g., bulk storage tanks, intermediate bulk containers, drums) for VOC-containing raw materials.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Degradation efficiency	88 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13		
Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 25 %.

	Mixture/Article	
	Physical Form (at time of use)	liquid
	Vapour pressure	> 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Semi-automated process (e.g.: Semi-automatic application of floor care and maintenance products)	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC4)
	Application of cleaning products in closed systems Outdoor	Ensure operation is undertaken outdoors.(PROC4)
	Cleaning of medical devices	Provide extract ventilation to points where emissions occur.(PROC4)
	Filling/ preparation of equipment from drums or containers. Outdoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC8a)
	Filling/ preparation of equipment from drums or containers. Dedicated facility	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC8b)
	Cleaning with low-pressure washers Rolling, Brushing no spraying	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC10)
	Manual Surfaces Cleaning	Limit the substance content in the product to 5 %. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC10)
	Ad hoc manual application via trigger sprays, dipping, etc. Rolling, Brushing	Provide extract ventilation to points where emissions occur.(PROC10)
	Cleaning with high pressure washers Spraying Indoor	Limit the substance content in the product to 5 %. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC11)
	Cleaning with high pressure washers Spraying Outdoor	Limit the substance content in the product to 1 %. Ensure operation is undertaken outdoors.(PROC11)
	Dipping, immersion and pouring Manual Surfaces Cleaning	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC13)
Conditions and measures related to personal protection, hygiene and health evaluation	Filling/ preparation of equipment from drums or containers. Outdoor	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily.(PROC8a)
	Ad hoc manual application via trigger	Wear a respirator conforming to EN140 with Type A filter or better.

	sprays, dipping, etc. Rolling, Brushing	Change filter cartridge on respirator daily.(PROC10)
	Cleaning with high pressure washers Spraying Outdoor	Wear suitable gloves tested to EN374. 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. Wear a respirator conforming to EN140 with Type A filter or better.(PROC11)

3. Exposure estimation and reference to its source

Environment

ERC8a: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC - local	0,00075mg/L	0,00288
ERC8a	---	Fresh water sediment	PEC - local	0,00448mg/kg dry weight (d.w.)	0,00358
ERC8a	---	Marine water	PEC - local	0,0000894mg/L	0,00344
ERC8a	---	Marine sediment	PEC - local	0,000533mg/kg dry weight (d.w.)	0,00426
ERC8a	---	Soil	PEC - local	0,000242mg/kg dry weight (d.w.)	0,00147
ERC8a	---	Sewage treatment plant (STP)	PEC	0,0274mg/L	0,000042
ERC8a	---	---	Msafe	3,05kg/day	---

Workers

PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	---	Inhalation worker exposure	30ppm	0,15
PROC2	---	Dermal worker exposure	0,822mg/kg/day	0,013
PROC3	---	Inhalation worker exposure	60ppm	0,30
PROC3	---	Dermal worker exposure	0,414mg/kg/day	0,007
PROC4	---	Inhalation worker exposure	52,5ppm	0,263
PROC4	---	Dermal worker exposure	4,116mg/kg/day	0,065
PROC8a	---	Inhalation worker exposure	21ppm	0,105
PROC8a, PROC8b, PROC13	---	Dermal worker exposure	8,226mg/kg/day	0,131
PROC8b, PROC13	---	Inhalation worker exposure	45ppm	0,225
PROC10	---	Inhalation worker	90ppm	0,45

		exposure		
PROC10	---	Dermal worker exposure	16,458mg/kg/day	0,261
PROC11	---	Inhalation worker exposure	70ppm	0,35
PROC11	---	Dermal worker exposure	21,428mg/kg/day	0,34

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

Environment
Not applicable for wide dispersive uses.
Health
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 9: Use in agrochemicals		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC27: Plant protection products	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d		
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Municipal sewage treatment is not assumed.	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	This substance is consumed during use and no waste of the substance is generated.
	Disposal methods	Dispose of empty containers and wastes safely.
2.2 Contributing scenario controlling consumer exposure for: PC27		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	50 g
	Amount used per event	0 g
	(swallowed)	
Frequency and duration of use	Frequency of use	1 Times per day
	Exposure duration per event	30 min
Human factors not influenced by risk management	Exposed skin area	Covers skin contact area up to 857 cm²
Other given operational conditions affecting consumers exposure	Outdoor use	

3. Exposure estimation and reference to its source

Environment

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0,66µg/L	0,00254
---	---	Marine water	PEC	0,117µg/L	0,0045
---	---	Fresh water sediment	PEC	3,97µg/kg dry weight (d.w.)	0,00318
---	---	Marine sediment	PEC	0,703µg/kg dry weight (d.w.)	0,00562
---	---	Soil	PEC	0,247µg/kg dry weight (d.w.)	0,00103

---	---	Sewage treatment plant (STP)	PEC	0,165µg/L	< 0,0001

ESVOC spERC 8.11b.v1 has been used to evaluate the exposure for the environment.

Consumers

PC27: ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC27	---	Consumer inhalation exposure	4,49mg/m³	0,0368
PC27	---	Consumer dermal exposure	21,1mg/kg bw/day	0,869

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

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see:
http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

1. Short title of Exposure Scenario 10: Use in agrochemicals		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8c, ERC8d, ERC8f		
Amount used	Daily amount per site	2,7 kg
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,9
	Emission or Release Factor: Water	0,01
	Emission or Release Factor: Soil	0,09
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Municipal sewage treatment is not assumed.	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	

Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	< 60 min(PROC8a, PROC13)
Technical conditions and measures to control dispersion from source towards the worker	Spraying/ fogging by manual application Indoor With Local Exhaust Ventilation with potential for aerosol generation	Carry out in a vented booth or extracted enclosure. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.(PROC11)
	Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.(PROC8a)
Conditions and measures related to personal protection, hygiene and health evaluation	Spraying/ fogging by manual application Indoor With Local Exhaust Ventilation with potential for aerosol generation	Wear suitable gloves tested to EN374. Wear suitable coveralls to prevent exposure to the skin.(PROC11)
	Spraying/ fogging by manual application Outdoor with potential for aerosol generation	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily. Wear suitable gloves tested to EN374. Wear suitable coveralls to prevent exposure to the skin.(PROC11)
	Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0,66µg/L	0,00254
---	---	Marine water	PEC	0,117µg/L	0,0045
---	---	Fresh water sediment	PEC	3,97µg/kg dry weight (d.w.)	0,00318
---	---	Marine sediment	PEC	0,703µg/kg dry weight (d.w.)	0,00562
---	---	Soil	PEC	0,247µg/kg dry weight (d.w.)	0,00103
---	---	Sewage treatment plant (STP)	PEC	0,165µg/L	< 0,0001

ESVOC spERC 8.11a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR

PROC2	---	Inhalation worker exposure	12ppm	0,06
PROC2	---	Dermal worker exposure	0,822mg/kg/day	0,013
PROC4	---	Inhalation worker exposure	30ppm	0,15
PROC4	---	Dermal worker exposure	4,116mg/kg/day	0,065
PROC8a	---	Inhalation worker exposure	12ppm	0,06
PROC8a	---	Dermal worker exposure	8,226mg/kg/day	0,131
PROC8b	---	Inhalation worker exposure	30ppm	0,15
PROC8b	---	Dermal worker exposure	4,116mg/kg/day	0,065
PROC11	---	Inhalation worker exposure	30ppm	0,15
PROC11	---	Dermal worker exposure	12,857mg/kg/day	0,204
PROC13	---	Inhalation worker exposure	12ppm	0,06
PROC13	---	Dermal worker exposure	8,226mg/kg/day	0,131

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

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 11: Use as lubricants		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC17: Lubrication at high energy conditions and in partly open process PROC18: Greasing at high energy conditions PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a		
Amount used	Annual amount per site	0,005 ton(s)/year
	Daily amount per site	0,013 kg/day
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	Emission or Release Factor: Water	100 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Soil	Soil emission controls are not applicable as there is no direct release to soil.
	Prevent environmental discharge consistent with regulatory requirements. Adequate closed storage facilities (e.g., bulk storage tanks, intermediate bulk containers, drums) for VOC-containing raw materials.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Degradation efficiency	88 %

Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	> 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (closed systems)	Handle substance within a closed system.(PROC1)
	Storage	Store substance within a closed system.(PROC2)
	General exposures (closed systems) Batch process With sample collection	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system.(PROC3)
	General exposures (open systems)	Provide extract ventilation to points where emissions occur. Ensure material transfers are under containment or extract ventilation.(PROC4)
	Filling/ preparation of equipment from drums or containers. Non-dedicated facility	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operation is undertaken outdoors. Use drum pumps or carefully pour from container. Provide enhanced general ventilation by mechanical means.(PROC8a)
	Maintenance (of larger plant items) and machine set up	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operation is undertaken outdoors. Drain down system prior to equipment break-in or maintenance. Clear transfer lines prior to de-coupling.(PROC8a)
	Maintenance (of larger plant items) and machine set up Elevated temperature	Provide extract ventilation to points where emissions occur. Drain down system prior to equipment break-in or maintenance. Clear transfer lines prior to de-coupling.(PROC8a)
	Bulk transfers	Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Handle substance within a closed system.(PROC8b)
	Filling/ preparation of equipment from drums or containers. Dedicated facility	Transfer via enclosed lines. Use drum pumps or carefully pour from container.(PROC8b)
	Maintenance of small items	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Drain or remove substance from equipment prior to break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.(PROC9)

	Rolling, Brushing Manual With Local Exhaust Ventilation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Provide extract ventilation to points where emissions occur.(PROC10)
	Spraying With Local Exhaust Ventilation	Limit the substance content in the product to 25 %. Carry out in a vented booth or extracted enclosure.(PROC11)
	Spraying Without Local Exhaust Ventilation	Limit the substance content in the product to 25 %.(PROC11)
	Treatment by dipping and pouring	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Allow time for product to drain from workpiece.(PROC13)
	Operation and lubrication of high energy open equipment Indoor	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.(PROC17, PROC18)
	Operation and lubrication of high energy open equipment Outdoor	Limit the substance content in the product to 5 %. Ensure operation is undertaken outdoors.(PROC17)
	Restrict area of openings to equipment.(PROC20)	
Conditions and measures related to personal protection, hygiene and health evaluation	Rolling, Brushing Manual Without Local Exhaust Ventilation	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily.(PROC10)
	Spraying Without Local Exhaust Ventilation	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily. Wear suitable gloves tested to EN374. 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.(PROC11)

3. Exposure estimation and reference to its source

Environment

ERC8a: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC - local	0,00075mg/L	0,00288
ERC8a	---	Fresh water sediment	PEC - local	0,00448mg/kg dry weight (d.w.)	0,00358
ERC8a	---	Marine water	PEC - local	0,0000894mg/L	0,00344
ERC8a	---	Marine sediment	PEC - local	0,000533mg/kg dry weight (d.w.)	0,00426
ERC8a	---	Soil	PEC - local	0,000242mg/kg dry weight (d.w.)	0,00147
ERC8a	---	Sewage treatment	PEC	0,0274mg/L	0,000042

		plant (STP)			
ERC8a	---	---	Msafe	3,05kg/day	---

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Inhalation worker exposure	0,01ppm	< 0,001
PROC1	---	Dermal worker exposure	0,03mg/kg/day	< 0,001
PROC2, PROC4, PROC8b, PROC18	---	Inhalation worker exposure	50ppm	0,25
PROC2, PROC4, PROC18	---	Dermal worker exposure	1,37mg/kg/day	0,022
PROC3, PROC10, PROC17	---	Inhalation worker exposure	70ppm	0,35
PROC3	---	Dermal worker exposure	0,69mg/kg/day	0,011
PROC8a	---	Inhalation worker exposure	80ppm	0,4
PROC8a, PROC8b, PROC13	---	Dermal worker exposure	13,71mg/kg/day	0,218
PROC9	---	Inhalation worker exposure	15ppm	0,075
PROC9	---	Dermal worker exposure	6,86mg/kg/day	0,109
PROC10	---	Dermal worker exposure	27,43mg/kg/day	0,435
PROC11	---	Inhalation worker exposure	60ppm	0,3
PROC11	---	Dermal worker exposure	12,857mg/kg/day	0,204
PROC13	---	Inhalation worker exposure	75ppm	0,375
PROC17	---	Dermal worker exposure	5,486mg/kg/day	0,087
PROC20	---	Inhalation worker exposure	25ppm	0,125
PROC20	---	Dermal worker exposure	1,71mg/kg/day	0,027

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

Environment
Not applicable for wide dispersive uses.
Health
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 12: Use in laboratories		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC4		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	20 tonnes
	Daily amount per site	1 ton(s)/day
Frequency and duration of use	Continuous exposure	20 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	Emission or Release Factor: Water	100 %
	Emission or Release Factor: Soil	0 %
	Indoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no secondary wastewater treatment required., Do not release wastewater directly into environment.
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.

	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	60 - 240 min
Human factors not influenced by risk management	Exposed skin area	One hand, face side only. 240 cm²
Other operational conditions affecting workers exposure	Indoor use	
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities	Handle in a fume cupboard or under extract ventilation.
Conditions and measures related to personal protection, hygiene and health evaluation	Laboratory activities	Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation and reference to its source

Environment

ERC4: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,0839mg/L	0,323
ERC4	---	Marine water	PEC	0,0084mg/L	0,323
ERC4	---	Fresh water sediment	PEC	0,1115mg/kg	0,398
ERC4	---	Marine sediment	PEC	0,0112mg/kg	0,040
ERC4	---	Soil	PEC	0,0002mg/kg	< 0,001
ERC4	---	Sewage treatment plant (STP)	PEC	0,8219mg/L	0,001
ERC4	---	Total daily intake via local environment	PEC	0,0021mg/kg bw/day	< 0,001

Workers

PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local	110,12mg/m³	0,151
PROC15	---	Worker - dermal, long-term - systemic	0,343mg/kg bw/day	0,005

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 13: Use in laboratories		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	0,75 tonnes
	Daily amount per site	2 kg/day
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	Emission or Release Factor: Water	100 %
	Emission or Release Factor: Soil	0 %
	Indoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no secondary wastewater treatment required., Do not release wastewater directly into environment.
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.

	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	60 - 240 min
Human factors not influenced by risk management	Exposed skin area	One hand, face side only. 240 cm²
Other operational conditions affecting workers exposure	Indoor use	
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities	Handle in a fume cupboard or under extract ventilation.
Conditions and measures related to personal protection, hygiene and health evaluation	Laboratory activities	Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation and reference to its source

Environment

ERC8a: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0,0839mg/L	0,323
ERC8a	---	Marine water	PEC	0,0084mg/L	0,323
ERC8a	---	Fresh water sediment	PEC	0,1115mg/kg	0,398
ERC8a	---	Marine sediment	PEC	0,0112mg/kg	0,040
ERC8a	---	Soil	PEC	0,0002mg/kg	< 0,001
ERC8a	---	Sewage treatment plant (STP)	PEC	0,8219mg/L	0,001
ERC8a	---	Total daily intake via local environment	PEC	0,0021mg/kg bw/day	< 0,001

Workers

PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local	110,12mg/m³	0,151
PROC15	---	Worker - dermal, long-term - systemic	0,343mg/kg bw/day	0,005

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 14: Use as extraction agent and/or processing aid		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU9: Manufacture of fine chemicals	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	
Environmental Release Categories	ERC1: Manufacture of substances ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC4		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual site tonnage	300 tonnes
	Daily amount per site	1 tonnes
	Fraction used at the main local source.	0,1
	Annually total	3000 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,5 %
	Emission or Release Factor: Water	1 %
	Emission or Release Factor: Soil	0,01 %
	Indoor use	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Air	Use containment measures to reduce fugitive emissions., Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation, Use appropriate emission abatement equipment from LEV systems if required by local legislation.
Organizational measures to prevent/limit release from the site	Keep container tightly closed. Store in a bounded area.	

	Water	Onsite wastewater treatment required, Do not release wastewater directly into environment.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Hazardous waste incineration, Dispose for use in recycled fuels.
	Disposal methods	Dispose of waste product or used containers according to local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min(PROC3, PROC4)
	Exposure duration per day	60 - 240 min(PROC8a, PROC8b)
Human factors not influenced by risk management	Exposed skin area	Palms of both hands 480 cm² (PROC3, PROC4)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC8b)
Other operational conditions affecting workers exposure	Indoor use	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Use in contained batch processes	Handle substance within a predominantly closed system provided with extract ventilation. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC3)
	General exposures Use in contained batch processes With sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC4)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation.

		Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

3. Exposure estimation and reference to its source

Environment

ERC1: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Fresh water	PEC	0,0106mg/L	0,041
ERC1	---	Marine water	PEC	0,0010mg/L	0,041
ERC1	---	Fresh water sediment	PEC	0,0141mg/kg	0,050
ERC1	---	Marine sediment	PEC	0,0014mg/kg	0,005
ERC1	---	Soil	PEC	0,0031mg/kg	0,014
ERC1	---	Sewage treatment plant (STP)	PEC	0,0778mg/L	< 0,001
ERC1	---	Total daily intake via local environment	PEC	0,0004mg/kg bw/day	< 0,001

Workers

PROC3, PROC4, PROC8a, PROC8b: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC3	---	Worker - inhalative, long-term - local	36,71mg/m³	0,050
PROC3	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	< 0,001
PROC4	---	Worker - inhalative, long-term - local	36,71mg/m³	0,050
PROC4	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC8a	---	Worker - inhalative, long-term - local	55,06mg/m³	0,075
PROC8a	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,0022

PROC8b	---	Worker - inhalative, long-term - local	9,91mg/m³	0,014
PROC8b	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:
PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction)
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

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