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BRENNTAG

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

ETHYLENE GLYCOL / IBC 1000 KG INCL

Version 6.1 Print Date 21.12.2020

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

1.1. Product identifier

Trade name	:	ETHYLENE GLYCOL / IBC 1000 KG INCL
Substance name	:	ethanediol
Index-No.	:	603-027-00-1
CAS-No.	:	107-21-1
EC-No.	:	203-473-3
EU REACH-Reg. No.	:	01-2119456816-28-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

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag Nordic AB Hyllie Stationstorg 31 SE 215 32 Malmö
Telephone	:	+46 (0)40-28 73 00
Telefax	:	+46 (0)40-93 7015
E-mail address	:	SDS.SE@brenntag-nordic.com
Responsible/issuing person	:	Environment & Quality

1.4. Emergency telephone number

Emergency telephone number	:	In case of personal injury call: Denmark: 82 12 12 12 Giftlinien, Bispebjerg Hospital Finland: Poison Information Centre: (09) 471 977 (direct) or (09) 47 11 (exchange), open 24h/day Norway: 22 59 13 00 Giftinformasjonen (døgnåpent) Sweden: +46-8-331231 Giftinformationscentralen (24 hour service) Outside these countries: Please call your local emergency services

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**
Acute toxicity (Oral)	Category 4	---	H302
Specific target organ toxicity - repeated exposure	Category 2	Kidney	H373

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

Most important adverse effects

Human Health	:	May cause damage to organs through prolonged or repeated exposure if swallowed. Vapours may cause irritation, headache, dizziness and may have narcotic effects and other central nervous effects. Prolonged skin contact may cause skin irritation. Splash in the eyes may cause discomfort. Harmful if swallowed., May cause dizziness, nausea, gastric pain, muscle weakness and unconsciousness. Kidney disease may occur. There is even a risk for liver disease and brain damage.
Physical and chemical hazards	:	Strong heating may produce combustible vapours which can form explosive mixture with air.
Potential environmental effects	:	According to available data, this product is not harmful to the environment.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :

Signal word	:	Warning	
Hazard statements	:	H302 H373	Harmful if swallowed. May cause damage to organs (Kidney) through prolonged or repeated exposure.
Precautionary statements			
Prevention	:	P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

		P264	Wash skin thoroughly after handling.
		P270	Do not eat, drink or smoke when using this product.
Response	:	P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

Hazardous components which must be listed on the label:

- ethanediol

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients

3.1. Substances

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
ethanediol			
Index-No. : 603-027-00-1 CAS-No. : 107-21-1 EC-No. : 203-473-3 EU REACH-Reg. No. : 01-2119456816-28-xxxx	>= 99 - <= 100	Acute Tox.4 STOT RE2	H302 H373

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	: Take off all contaminated clothing immediately.
If inhaled	: Move to fresh air. If symptoms call a physician.
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. If eye irritation persists, consult a specialist.

If swallowed	: Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. 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	: 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	:	Vapors may produce explosive mixtures with air at temperatures over the flash point. Keep containers cool by spraying with water if exposed to fire, Heating will cause a pressure rise - with risk of bursting
Hazardous combustion products	:	Carbon monoxide, Carbon dioxide (CO_2)

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	:	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	: Use personal protective equipment. Keep away unprotected persons. Ensure 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	:	Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.
Further information	:	Treat recovered material as described in the section "Disposal considerations".

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. Avoid formation of aerosol. 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.
Advice on protection against fire and explosion	:	Combustible liquid. Keep away from sources of ignition - No smoking.
Further information on storage conditions	:	Keep tightly closed in a dry and cool place.
Advice on common storage	:	Keep away from food, drink and animal feedingstuffs.
Storage temperature	:	0 - 50 °C

Suitable packaging materials	:	Stainless steel
Unsuitable packaging materials	:	, Aluminium

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:	**ethanediol**	**CAS-No. 107-21-1**

Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL Workers, Long-term - local effects, Inhalation	:	35 mg/m3
DNEL Workers, Long-term - systemic effects, Skin contact	:	106 mg/kg bw/day
DNEL Consumers, Long-term - local effects, Inhalation	:	7 mg/m3
DNEL Consumers, Long-term - systemic effects, Skin contact	:	53 mg/kg bw/day

Predicted No Effect Concentration (PNEC)

Fresh water	:	10 mg/l
Marine water	:	1 mg/l
Intermittent releases	:	10 mg/l
Sewage treatment plant (STP)	:	199,5 mg/l
Fresh water sediment	:	20,9 mg/kg
Soil	:	1,53 mg/kg

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):
20 ppm, 52 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):
40 ppm, 104 mg/m3
Indicative

Sweden. Occupational Exposure Limit Values, as amended, Time Weighted Average (TWA):
10 ppm, 25 mg/m3

Sweden. Occupational Exposure Limit Values, as amended, Skin designation:
Can be absorbed through the skin.

Sweden. Occupational Exposure Limit Values, as amended, Short Term Exposure Limit
40 ppm, 104 mg/m3

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). Respiratory protection complying with EN 141. Combination filter: A-P2

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	:	polychloroprene
Break through time	:	>= 8 h
Glove thickness	:	0,5 mm
Material	:	Nitrile rubber
Break through time	:	>= 8 h
Glove thickness	:	0,35 mm
Material	:	butyl-rubber

Break through time	:	>= 8 h
Glove thickness	:	0,5 mm

Material	:	Fluorinated rubber
Break through time	:	>= 8 h
Glove thickness	:	0,4 mm

Material	:	Polyvinylchloride
Break through time	:	>= 8 h
Glove thickness	:	0,5 mm

Eye protection

Advice	:	Safety goggles

Skin and body protection

Advice	:	Wear personal protective equipment.

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
Colour	:	clear colourless to coloured
Odour	:	characteristic
Odour Threshold	:	no data available
pH	:	7,1 - 7,3
Melting point/range	:	-13 °C
Boiling point/boiling range	:	197,4 °C (1013 hPa)
Flash point	:	111 °C
Evaporation rate	:	0,01 (Butyl Acetate = 1)
Flammability (solid, gas)	:	Not applicable

Upper explosion limit	:	15,3 %(V)
Lower explosion limit	:	3,2 %(V)
Vapour pressure	:	0,2 hPa (20 °C)
Relative vapour density	:	2,1
Density	:	1,122 g/cm3 (20 °C) (DIN 51757)
Water solubility	:	soluble
Partition coefficient: n-octanol/water	:	log Kow ca. -1,36 (23 °C) ((calculated))
Auto-ignition temperature	:	398 °C
Thermal decomposition	:	> 500 °C
Viscosity, dynamic	:	16,1 mPa.s (20 °C)
Viscosity, kinematic	:	20 - 30 mm2/s (20 °C) (DIN 51562)
Explosivity	:	Product is not explosive.
Oxidizing properties	:	not oxidising

9.2. Other information

Molecular weight	:	62,07 g/mol

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 : Corrodes aluminium. Reacts with the following substances: Oxidizing agents Sodium hydroxide Sulphuric acid

10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.
Thermal decomposition : > 500 °C

10.5. Incompatible materials

Materials to avoid : Strong oxidizing agents, Strong acids and strong bases

10.6. Hazardous decomposition products

Hazardous decomposition products : Under fire conditions: Carbon monoxide, Carbon dioxide (CO2)

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Data for the product		
Acute toxicity		
Oral		
		Harmful if swallowed., May cause dizziness, nausea, gastric pain, muscle weakness and unconsciousness. Kidney disease may occur. There is even a risk for liver disease and brain damage.
Inhalation		
		Vapours may cause irritation, headache, dizziness and may have narcotic effects and other central nervous effects.
Irritation		
Skin		
Result	:	Prolonged skin contact may cause skin irritation.
Eyes		
Result	:	Splash in the eyes may cause discomfort.

Component:	**ethanediol**	**CAS-No. 107-21-1**
Acute toxicity		
Oral		
		No valid data available.
Inhalation		
LC50	:	> 2,5 mg/l (Rat; 6 h; dust/mist)
Dermal		
LD50	:	> 3500 mg/kg (Mouse, male and female)
Irritation		
Skin		

Result	:	No skin irritation (Rabbit)

Eyes

Result	:	No 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	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
Teratogenicity	:	Ingestion of excessive amounts by pregnant animals resulted in maternal and foetal toxicity.
Reproductive toxicity	:	Animal testing did not show any effects on fertility.

Specific Target Organ Toxicity

Single exposure

Remarks	:	no data available

Repeated exposure

Ingestion	:	Target Organs: KidneyMay cause damage to organs through prolonged or repeated exposure.

Other toxic properties

Aspiration hazard

No aspiration toxicity classification,

SECTION 12: Ecological information

12.1. Toxicity

Component:	ethanediol	CAS-No. 107-21-1

Acute toxicity

Fish		
LC50	:	72.860 mg/l (Pimephales promelas; 96 h) (static test; EPA OPP 72-1)

Toxicity to daphnia and other aquatic invertebrates		
EC50	:	> 100 mg/l (Daphnia magna; 48 h) (OECD Test Guideline 202)

algae		
EC50	:	6500 - 13000 mg/l (Selenastrum capricornutum; 96 h) (End point: Growth rate)

Bacteria		
EC20	:	> 1995 mg/l (activated sludge; 0,5 h) (ISO 8192)Read-across (Analogy)

Chronic toxicity		
Fish		
NOEC	:	15380 mg/l (Pimephales Promelas; 7 d)
Aquatic invertebrates		
NOEC		8590 mg/l (Ceriodaphnia dubia (water flea); 7 d)

12.2. Persistence and degradability

Component:	ethanediol	CAS-No. 107-21-1
Persistence and degradability		
Persistence		
Result	:	(Related to: Water) non-significant hydrolysis
Biodegradability		
Result	:	90 - 100 % (aerobic; activated sludge; 53 mg/l; Related to: Dissolved organic carbon (DOC); Exposure Time: 10 d)(OECD

Test Guideline 301A)Readily biodegradable.

12.3. Bioaccumulative potential

Component:	ethanediol	CAS-No. 107-21-1
Bioaccumulation		

Result : log Kow ca. -1,36 (23 °C) ((calculated))
: Bioaccumulation is not expected.

12.4. Mobility in soil

Component:	ethanediol	CAS-No. 107-21-1
Mobility		

Water : The product is water soluble.
Air : The substance will not evaporate into the atmosphere from the water surface.
Soil : Adsorption to solid soil phase is not expected.

12.5. Results of PBT and vPvB assessment

Component:	ethanediol	CAS-No. 107-21-1
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. Other adverse effects

Data for the product		
Additional ecological information		

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

Component:	ethanediol	CAS-No. 107-21-1
Biochemical Oxygen Demand (BOD)		

Result : 1245 mg/g

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	:	Eliminate waste in conditions authorized by the regulations. Store waste in containers provided for this purpose. Do not dump in drains, water sheets or the ground.
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.
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

Not dangerous goods for ADR, RID, IMDG and IATA.

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packaging group

Not applicable.

14.5. Environmental hazards

Not applicable.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information

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

Data for the product

Other regulations	:	Only persons, who are thoroughly instructed in the dangerous properties and the necessary safety precautions of the substance, are allowed to work with it. Exposure limits in accordance to local regulations

Component:	**ethanediol**	**CAS-No. 107-21-1**

EU. Regulation EU No. 649/2012 concerning the export and import of dangerous chemicals	:	; The substance/mixture does not fall under this legislation.
EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC)	:	Point Nos.: , 3; Listed
EU. Regulation No 1451/2007 [Biocides], Annex I, OJ (L 325)	:	EC Number: , 203-473-3; Listed
EU. Directive 2012/18/EU (SEVESO III) Annex I	:	; The substance/mixture does not fall under this legislation.

Notification status
ethanediol:

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	203-473-3
ENCS (JP)	YES	(2)-230
IECSC	YES	
ISHL (JP)	YES	(2)-230
JEX (JP)	YES	(2)-230
KECI (KR)	YES	KE-13169
NZIOC	YES	HSR001534
PICCS (PH)	YES	
TSCA	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.

H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure.

Abbreviations and Acronyms

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
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
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
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

Key literature references : Supplier information and data from the "Database of registered

and sources for data		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	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Distribution of substance	3	NA	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1	NA	ES10
2	Formulation & (re)packing of substances and mixtures	3	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	NA	ES12
3	Use in coatings	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15	4	NA	ES16
4	Use in coatings	21	NA	9a, 15, 18, 31	NA	8d	NA	ES148
5	Use in cleaning agents	3	NA	NA	1, 2, 3, 4, 7, 8a, 8b, 10, 13	4	NA	ES35
6	Use in cleaning agents	22	NA	NA	1, 2, 3, 4, 8a, 8b, 10, 11, 13	8a	NA	ES38
7	Use in agrochemicals	22	NA	NA	1, 2, 4, 8a, 8b, 9, 11, 13	8d	NA	ES236
8	Use as lubricants	3	NA	NA	1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18	4	NA	ES108
9	Use as Functional Fluids	3	NA	NA	1, 2, 3, 4, 8a, 8b, 9	7	NA	ES241
10	Use as Functional Fluids	22	NA	NA	1, 2, 3, 8a, 9, 20	9b	NA	ES243
11	Use in laboratories	3	NA	NA	15	2, 4	NA	ES116
12	Use in metal working fluids / rolling oils	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 17	4	NA	ES111
13	Use in metal working fluids / rolling oils	22	NA	NA	1, 2, 3, 5, 8a, 8b, 9, 10, 11, 13, 17	8a	NA	ES128
14	Use as water treatment chemicals	3	NA	NA	1, 2, 3, 4, 8a, 8b, 13	3	NA	ES120
15	Use as an intermediate	3	NA	NA	1, 2, 3, 4, 8a, 8b, 9, 15	6a	NA	ES5
16	Use in coatings/adhesives/sealants/foams/polymer processing	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 14, 15, 19	8d	NA	ES18

1. Short title of Exposure Scenario 1: Distribution of substance	
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 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	ERC1: Manufacture of substances
Activity	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

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	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,002
	Maximum daily site tonnage (kg/day):	6667 kg
Frequency and duration of use	Continuous exposure	300 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,001 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	0,001 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0,001 %
	initial release prior to RMM, Regional only.	
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	No air emission controls required; required removal efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release	

Organizational measures to prevent/limit release from the site	estimates used.	
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, 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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3, PROC15)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC9)
	Exposed skin area	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 1.1b.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3, PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b, PROC9, PROC15	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b,	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06

PROC9				
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 2: 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	
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) PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC2: Formulation of preparations	
Activity	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.	
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	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,03
	Maximum daily site tonnage (kg/day):	100000 kg
Frequency and duration of use	Continuous exposure	300 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	0,5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0,01 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to	Air	No air emission controls required; required removal

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		efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, 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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3, PROC15)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC14)
	Exposed skin area	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 2.2.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3, PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2, PROC5	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22

PROC4, PROC5, PROC8b, PROC9, PROC14, PROC15	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC14	---	Worker - dermal, long-term - systemic	3,43mg/kg bw/day	0,03

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 3: 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	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
Activity	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.	
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	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	1
	Maximum daily site tonnage (kg/day):	39945 kg
Frequency and duration of use	Continuous exposure	220 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	98 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	2 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to	Air	Treat air emission to provide a typical removal

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		efficiency of (%): (Efficiency: 95 %)
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Wet scrubber for elimination of volatile components from waste gases, or, Filtration aids

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, 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
Amount used		600 mL/min (PROC7)
	Regular inspection and maintenance of equipment and machines.(PROC7)	
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC7)
	Frequency of use	240 days/year(except PROC7)
	Exposure duration per day	< 6 h(Critical for: PROC7)
	Frequency of use	4 - 5 days/week(Critical for: PROC7)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3, PROC15)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC5, PROC8b, PROC13)
	Exposed skin area	Whole body (PROC7)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC7)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Ensure that the task is not carried out overhead. Regular inspection and maintenance of equipment and machines. Clean equipment and the work area every day.(PROC7)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5)	
	If no LEV: Wear respiratory protection(PROC8a)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13)	
	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. CEPE spERC 4.1b.v1 has been used to evaluate the exposure for the environment.

Workers

PROC7: StoffenManager (inhalation exposure)

PROC7: RISKOFDERM

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC13, PROC15: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3, PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2, PROC5, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC5, PROC8b, PROC15	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC7	---	Worker - inhalative, long-term - local and systemic.	9,79mg/m³	0,28
PROC7	---	Worker - dermal, long-term - systemic	54,6mg/m3	0,52
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,87mg/m³	0,74
PROC10	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03

The exposure estimate represents the 75th percentile of the exposure distibution. PROC7.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC7
Please note that modified version has been used (see exposure estimates).
Scaling for PROC7 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC7 (inhalation) https://www.stoffenmanager.nl/default.aspx

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 4: Use in coatings		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC9a: Coatings and paints, thinners, paint removers PC15: Non-metal-surface treatment products PC18: Ink and toners PC31: Polishes and wax blends	
Environmental Release Categories	ERC8d: Wide dispersive outdoor use of processing aids in open systems	
Activity	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning.	
2.1 Contributing scenario controlling environmental exposure for: ERC8d		
Amount used	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,002
	Maximum daily site tonnage (kg/day):	5479 kg
Frequency and duration of use	Continuous exposure	365 days/year, Continuous process
Environment factors not influenced by risk management	Other data.Other information	Local freshwater dilution factor: 10
	Other data.Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	98 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	2 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, .	
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 (%): (Efficiency: 95 %)
	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %)
2.2 Contributing scenario controlling consumer exposure for: PC9a: Waterborne wall paint, PC15: Waterborne wall paint		
This contributing scenario is intended to represent a reasonable worst-case scenario		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 5%.
	Physical Form (at time of use)	liquid
Amount used		1,25 kg
Frequency and duration of use	Application duration	120 min

	Non spray applications	
	Exposure duration per day	132 min
	Frequency of use	1 days/year
Human factors not influenced by risk management	Exposed skin area	Hands and forearms. 1900 cm²
Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	20 m3
	Temperature	25 °C
	Ventilation rate per hour	0,6
	Mass transfer rate	0,331 m/min
	Release area	10 m2
	Release duration	7200 sec
2.3 Contributing scenario controlling consumer exposure for: PC9a: Aerosol spray can, PC15: Aerosol spray can		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 5%.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Spray Duration	15 min
	Exposure duration per day	15 min
	Frequency of use	2 days/year
Human factors not influenced by risk management	Exposed skin area	Hands and forearms. 1900 cm²
Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	34 m3
	Temperature	25 °C
	Ventilation rate per hour	1,5
	Release duration	900 sec
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Ensure spraying away from persons.
2.4 Contributing scenario controlling consumer exposure for: PC18: Refilling of toners		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 5%.
	Physical Form (at time of use)	liquid
Amount used		0,05 kg (PC18)
Frequency and duration of use	Application duration	0,3 min
	Exposure duration per day	0,75 min
	Frequency of use	104 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 215 cm²
Other given operational conditions affecting consumers	Indoor use	
	Temperature	25 °C

exposure	Ventilation rate per hour	0,5
	Release area	20 cm²
	Mass transfer rate	0,331 m/min
2.5 Contributing scenario controlling consumer exposure for: PC18: Printing Process		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 5%.
	Physical Form (at time of use)	liquid
Amount used		0,016 kg
Frequency and duration of use	Application duration	600 min
	Exposure duration per day	600 min
	Frequency of use	365 days/year
Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	25 m3
	Temperature	25 °C
	Ventilation rate per hour	0,6
2.6 Contributing scenario controlling consumer exposure for: PC31: Polishes, wax / cream (floor, furniture, shoes)		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 2,5%
	Physical Form (at time of use)	liquid
Amount used	Amount used per event	0,55 kg
Frequency and duration of use	Application duration	900 min
	Non spray applications	
	Exposure duration per day	240 min
	Frequency of use	1 days/year
Human factors not influenced by risk management	Exposed skin area	Palms of both hands 430 cm²
Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	58 m3
	Temperature	25 °C
	Ventilation rate per hour	0,5
	Release area	22 m2
	Mass transfer rate	4740 m/min
	Release duration	7200 sec

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. CEPE spERC 8a.n.v1 has been used to evaluate the exposure for the environment.

Consumers

PC9a: Aerosol spray can, PC15: Aerosol spray can, PC31: Polishes, wax / cream, PC18: Refilling of toners, PC18:

Printing Process, PC9a: Waterborne wall paint, PC15: Waterborne wall paint: ConsExpo 4.1				
Contributing Scenario	**Specific conditions**	**Exposure routes**	**Level of Exposure**	**RCR**
PC9a: Waterborne wall paint, PC15: Waterborne wall paint	---	Consumer-inhalative, long-term - local and systemic.	0,72mg/m³	0,1
PC9a: Waterborne wall paint, PC15: Waterborne wall paint	---	Consumer - dermal, long-term - systemic	2,77mg/kg bw/day	0,05
PC9a: Aerosol spray can, PC15: Aerosol spray can	---	Consumer-inhalative, long-term - local and systemic.	0,26mg/m³	0,04
PC9a: Aerosol spray can, PC15: Aerosol spray can	---	Consumer - dermal, long-term - systemic	1,15mg/kg bw/day	0,02
PC9a: Aerosol spray can, PC15: Aerosol spray can	---	consumer oral, long term - systemic	0,13mg/kg bw/day	< 1
PC18: Refilling of toners	---	Consumer-inhalative, long-term - local and systemic.	---	< 1
PC18: Refilling of toners	---	Consumer - dermal, long-term - systemic	0,008mg/kg bw/day	0,0002
PC18: Printing Process	---	Consumer-inhalative, long-term - local and systemic.	1,29mg/m³	0,18
PC31: Polishes, wax / cream	---	Consumer-inhalative, long-term - local and systemic.	3,93mg/m3	0,56
PC31: Polishes, wax / cream	---	Consumer - dermal, long-term - systemic	2,12mg/kg bw/day	0,04
Relevant for section 2.5: Dermal exposure is not considered to be relevant.				

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
The ConsExpo model has been used to estimate consumer exposures unless otherwise indicated.

1. Short title of Exposure Scenario 5: Use in cleaning agents	
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 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
Activity	Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).

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	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,000011
	Maximum daily site tonnage (kg/day):	50 kg
Frequency and duration of use	Continuous exposure	220 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	100 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Air	No air emission controls required; required removal efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)

releases to soil Organizational measures to prevent/limit release from the site	Common practices vary across sites thus conservative process release estimates used.	
2.2 Contributing scenario controlling worker exposure for: PROC1, 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
Amount used		600 mL/min (PROC7)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC7)
	Exposure duration per day	< 6 h(Critical for: PROC7)
	Frequency of use	< 240 days/year(except PROC7)
	Frequency of use	4 - 5 days/week(Critical for: PROC7)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC13)
	Exposed skin area	Whole body (PROC7)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC7)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Ensure that the task is not carried out overhead. Ensure control measures are regularly inspected and maintained. Clean equipment and the work area every day.(PROC7)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13)	
	If no LEV: Wear respiratory protection(PROC8a)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. AISE spERC 4.1 has been used to evaluate the exposure for the environment.

Workers

PROC7: StoffenManager (inhalation exposure)

PROC7: RISKOFDERM

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC13: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR

PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC7	---	Worker - inhalative, long-term - local and systemic.	9,79mg/m³	0,28
PROC7	---	Worker - dermal, long-term - systemic	54,6mg/m3	0,52
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,87mg/m³	0,74
PROC10	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03

The exposure estimate represents the 75th percentile of the exposure distibution. PROC7.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC7
Please note that modified version has been used (see exposure estimates).
Scaling for PROC7 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC7 (inhalation) https://www.stoffenmanager.nl/default.aspx

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 6: Use in cleaning agents		
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 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	
Activity	Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).	
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	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,00075
	Maximum daily site tonnage (kg/day):	1580 kg
Frequency and duration of use	Continuous exposure	365 days/year, Wide dispersive use
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	100 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to prevent release	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %)
Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Common practices vary across sites thus conservative process release estimates used.	

releases to soil Organizational measures to prevent/limit release from the site		

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, 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
Amount used		0,05 L/min (PROC11)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC11)
	Exposure duration per day	< 150 min(Critical for: PROC11)
	Frequency of use	4 - 5 days/week(Critical for: PROC11)
	Frequency of use	< 240 days/year(except PROC11)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC13)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10)
	Exposed skin area	Whole body (PROC11)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC11)
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC8a, PROC10)	
	Provide extract ventilation to points where emissions occur.(PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is not carried out by more than one worker. Ensure that the task is not carried out overhead. Ensure control measures are regularly inspected and maintained. Clean equipment and the work area every day.(PROC11)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a, PROC10)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC10, PROC11, PROC13)	
	If no LEV: Wear respiratory protection. (Efficiency: 40 %)(PROC11)	
	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. AISE spERC 8a.1 has been used to evaluate the exposure for the environment.

Workers

PROC11: StoffenManager (inhalation exposure)

PROC11: RISKOFDERM

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC13: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a, PROC10	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,88mg/m³	0,74
PROC4, PROC8b	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC10	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03
PROC11	---	Worker - inhalative, long-term - local and systemic.	14,05mg/m³	0,4
PROC11	---	Worker - dermal, long-term - systemic	53,75mg/kg bw/day	0,51

The exposure estimate represents the 75th percentile of the exposure distibution. PROC11.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC11
Please note that modified version has been used (see exposure estimates).
Scaling for PROC11 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC11 (inhalation) https://www.stoffenmanager.nl/default.as

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 7: Use in agrochemicals	
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 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) PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC8d: Wide dispersive outdoor use of processing aids in open systems
Activity	Use as an agrochemical excipient for application by manual or machine spraying, smokes and fogging; including equipment clean-downs and disposal.

2.1 Contributing scenario controlling environmental exposure for: ERC8d		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,002
	Maximum daily site tonnage (kg/day):	5479 kg
Frequency and duration of use	Continuous exposure	365 days/year, Wide dispersive use
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	0 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
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	No air emission controls required; required removal efficiency is 0%.
	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 0 %)
	Common practices vary across sites thus conservative process release estimates used.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC11, 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
Amount used		0,05 L/min (PROC11)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC11)
	Exposure duration per day	< 150 min(Critical for: PROC11)
	Frequency of use	< 240 days/year(except PROC11)
	Frequency of use	4 - 5 days/week(Critical for: PROC11)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC9, PROC13)
	Exposed skin area	Two hands 960 cm² (PROC8a)
	Exposed skin area	Whole body (PROC11)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC11)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a)	
	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is not carried out by more than one worker. Ensure that the task is not carried out overhead. Clean equipment and the work area every day. Ensure control measures are regularly inspected and maintained.(PROC11)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	
	Wear respiratory protection. (Efficiency: 40 %)(PROC11)	
	In case no respiratory protection is used, a LEV with adequate effectiveness is required.(PROC11)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC11, PROC13)	
	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ECPA spERC 8d.2.v1 has been used to evaluate the exposure for the environment.

Workers

PROC11: StoffenManager (inhalation exposure)

PROC11: RISKOFDERM

PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC13: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR

PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC4, PROC8b, PROC9, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,88mg/m³	0,74
PROC4, PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC11	---	Worker - inhalative, long-term - local and systemic.	14,05mg/m³	0,4
PROC11	---	Worker - dermal, long-term - systemic	53,75mg/kg bw/day	0,51

The exposure estimate represents the 75th percentile of the exposure distibution. PROC11.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC11
Please note that modified version has been used (see exposure estimates).
Scaling for PROC11 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC11 (inhalation) https://www.stoffenmanager.nl/default.as

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 8: Use as lubricants		
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 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 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing 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	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
Activity	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.	
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	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,0001
	Maximum daily site tonnage (kg/day):	5000 kg
Frequency and duration of use	Continuous exposure	20 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,03 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	0,1 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0,1 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to prevent release	Air	No air emission controls required; required removal efficiency is 0%.

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	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18

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
Amount used		600 mL/min (PROC7)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC7)
	Exposure duration per day	< 6 h(Critical for: PROC7)
	Frequency of use	< 240 days/year(except PROC7)
	Frequency of use	4 - 5 days/week(Critical for: PROC7)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC9, PROC13)
	Exposed skin area	Whole body (PROC7)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10, PROC17, PROC18)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC7)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a, PROC17, PROC18)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is not carried out overhead. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Clean equipment and the work area every day. Ensure control measures are regularly inspected and maintained.(PROC7)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13, PROC17, PROC18)	
	If no LEV: Wear respiratory protection(PROC8a)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 4.6a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC7: RISKOFDERM

PROC7: StoffenManager (inhalation exposure)

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a, PROC17, PROC18	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b, PROC9	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC7	---	Worker - inhalative, long-term - local and systemic.	9,79mg/m³	0,28
PROC7	---	Worker - dermal, long-term - systemic	54,6mg/kg bw/day	0,52
PROC8a, PROC18	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,87mg/m³	0,74
PROC10, PROC17	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03

The exposure estimate represents the 75th percentile of the exposure distibution. PROC7.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).
Scaling for PROC7 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC7 (inhalation) https://www.stoffenmanager.nl/default.aspx

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 9: Use as Functional Fluids	
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 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)
Environmental Release Categories	ERC7: Industrial use of substances in closed systems
Activity	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.

2.1 Contributing scenario controlling environmental exposure for: ERC7		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,00001
	Maximum daily site tonnage (kg/day):	500 kg
Frequency and duration of use	Continuous exposure	20 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,1 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	0,1 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0,1 %
	initial release prior to RMM, Regional only.	
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	No air emission controls required; required removal efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	

prevent/limit release from the site		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9		
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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	< 240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC9)
	Exposed skin area	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 7.13a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b, PROC9	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC8a	---	Worker - dermal, long-	13,71mg/kg bw/day	0,13

		term - systemic		

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 10: Use as Functional Fluids	
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 PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems
Environmental Release Categories	ERC9b: Wide dispersive outdoor use of substances in closed systems
Activity	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers.

2.1 Contributing scenario controlling environmental exposure for: ERC9b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,002
	Maximum daily site tonnage (kg/day):	5479 kg
Frequency and duration of use	Continuous exposure	365 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	5 %
	initial release prior to RMM, Regional only.	
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	No air emission controls required; required removal efficiency is 0%.
	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC9, 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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	< 240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC9, PROC20)
	Exposed skin area	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3.

Workers

PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a, PROC20	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC9	---	Worker - inhalative, long-term - local and systemic.	25,88mg/m³	0,74
PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC20	---	Worker - dermal, long-	1,71mg/kg bw/day	0,02

		term - systemic		

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 11: 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	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
Activity	Use of the substance within laboratory settings, including material transfers and equipment cleaning	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,0005
	Maximum daily site tonnage (kg/day):	5479 kg
Frequency and duration of use	Continuous exposure	365 days/year, Wide dispersive use
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	50 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	50 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
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	No air emission controls required; required removal efficiency is 0%.
	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	
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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h

	Frequency of use	< 240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC15)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3.

Workers

PROC15: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 12: Use in metal working fluids / rolling oils		
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 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC17: Lubrication at high energy conditions and in partly open process	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
Activity	Covers the use in formulated MWFs/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils.	
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	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,0001
	Maximum daily site tonnage (kg/day):	5000 kg
Frequency and duration of use	Continuous exposure	20 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,0003 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	0,1 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	

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	No air emission controls required; required removal efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17		
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
Amount used		0,6 L/min (PROC7)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC7)
	Exposure duration per day	< 6 h(Critical for: PROC7)
	Frequency of use	< 240 days/year(except PROC7)
	Frequency of use	4 - 5 days/week(Critical for: PROC7)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10, PROC17)
	Exposed skin area	Whole body (PROC7)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC7)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a, PROC17)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Ensure that the task is not carried out overhead. Clean equipment and the work area every day. Ensure control measures are regularly inspected and maintained.(PROC7)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13, PROC17)	
	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)	
	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 4.7a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC7: StoffenManager (inhalation exposure)

PROC7: RISKOFDERM

PROC1, PROC2, PROC3, PROC8a, PROC17: ECETOC TRA worker v3

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a, PROC17	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2, PROC5, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC5, PROC8b, PROC9	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC7	---	Worker - inhalative, long-term - local and systemic.	9,79mg/m³	0,28
PROC7	---	Worker - dermal, long-term - systemic	54,6mg/kg bw/day	0,52
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,87mg/m³	0,74
PROC10, PROC17	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03

The exposure estimate represents the 75th percentile of the exposure distibution. PROC7.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC7
Please note that modified version has been used (see exposure estimates).
Scaling for PROC7 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC7 (inhalation) https://www.stoffenmanager.nl/default.aspx

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 13: Use in metal working fluids / rolling oils		
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 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) 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	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
Activity	Covers the use in formulated MWFs including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/ reject articles, and disposal of waste oils.	
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	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,0005
	Maximum daily site tonnage (kg/day):	1370 kg
Frequency and duration of use	Continuous exposure	365 days/year, Wide dispersive use
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	1,5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	5 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to prevent release	Air	No air emission controls required; required removal efficiency is 0%.

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	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17

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
Amount used		0,05 L/min (PROC11)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC11)
	Exposure duration per day	< 150 min(Critical for: PROC11)
	Frequency of use	< 240 days/year(except PROC11)
	Frequency of use	4 - 5 days/week(Critical for: PROC11)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC5, PROC8b, PROC9, PROC13)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10, PROC17)
	Exposed skin area	Whole body (PROC11)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	1000 m3(PROC11)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a, PROC10)	
	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11)	
	Provide extract ventilation to points where emissions occur. (Efficiency: 90 %)(PROC17)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the task is not carried out by more than one worker. Ensure that the task is not carried out overhead. Clean equipment and the work area every day. Ensure control measures are regularly inspected and maintained.(PROC11)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a, PROC10, PROC17)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC10, PROC11, PROC13, PROC17)	
	Wear respiratory protection. (Efficiency: 40 %)(PROC11)	
	In case no respiratory protection is used, a LEV with adequate effectiveness is required.(PROC11)	
	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 8.7c.v1 has been used to evaluate the exposure for the environment.

Workers

PROC11: StoffenManager (inhalation exposure)

PROC11: RISKOFDERM

PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a, PROC10, PROC17	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC5, PROC8b, PROC9, PROC13	---	Worker - inhalative, long-term - local and systemic.	25,88mg/m³	0,74
PROC5, PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC10, PROC17	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03
PROC11	---	Worker - inhalative, long-term - local and systemic.	14,05mg/m³	0,4
PROC11	---	Worker - dermal, long-term - systemic	53,75mg/kg bw/day	0,51

The exposure estimate represents the 75th percentile of the exposure distibution. PROC11.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC11
Please note that modified version has been used (see exposure estimates).
Scaling for PROC11 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC11 (inhalation) https://www.stoffenmanager.nl/default.as

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 14: Use as water treatment chemicals	
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 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 PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC3: Formulation in materials
Activity	Covers the use of the substance for the treatment of water at industrial facilities in open and closed systems.

2.1 Contributing scenario controlling environmental exposure for: ERC3		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,00003
	Maximum daily site tonnage (kg/day):	100 kg
Frequency and duration of use	Continuous exposure	300 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	5 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	95 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
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	No air emission controls required; required removal efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, 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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	< 240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC13)
	Exposed skin area	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	
	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC13)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 3.22a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4, PROC8b	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC13	---	Worker - inhalative, long-	25,87mg/m³	0,74

		term - local and systemic.		

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For further information on the assessment method, see: http://www.ecetoc.org/tra
Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 15: Use as an intermediate		
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 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	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)	
Activity	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
2.1 Contributing scenario controlling environmental exposure for: ERC6a		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,015
	Maximum daily site tonnage (kg/day):	50000 kg
Frequency and duration of use	Continuous exposure	300 days/year, Continuous release
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,002 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	1 %
	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0,1 %
	initial release prior to RMM, Regional only.	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Air	No air emission controls required; required removal efficiency is 0%.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)

releases to soil Organizational measures to prevent/limit release from the site	Common practices vary across sites thus conservative process release estimates used.	
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, 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, low fugacity
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	< 240 days/year
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3, PROC15)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC8b, PROC9)
	Exposed skin area	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor use	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a)	
Conditions and measures related to personal protection, hygiene and health evaluation	If no LEV: Wear respiratory protection(PROC8a)	

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. ESVOC spERC 6.1a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3, PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a	---	Worker - inhalative, long-term - local and systemic.	2,59mg/m³	0,07
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC8b, PROC9, PROC15	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC4,	---	Worker - dermal, long-	6,86mg/kg bw/day	0,06

PROC8b, PROC9		term - systemic		
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
Please note that modified version has been used (see exposure estimates).
For further information on the assessment method, see: http://www.ecetoc.org/tra

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

1. Short title of Exposure Scenario 16: Use in coatings/adhesives/sealants/foams/polymer processing	
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 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 PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8d: Wide dispersive outdoor use of processing aids in open systems
Activity	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation), and equipment cleaning, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for: ERC8d		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,002
	Maximum daily site tonnage (kg/day):	5479 kg
Frequency and duration of use	Continuous exposure	365 days/year, Continuous process
Environment factors not influenced by risk management	Other data. Other information	Local freshwater dilution factor: 10
	Other data. Other information	Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	98 %
	initial release prior to RMM, .	
	Emission or Release Factor: Water	2 %

	initial release prior to RMM, .	
	Emission or Release Factor: Soil	0 %
	initial release prior to RMM, Regional only.	
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 (%): (Efficiency: 95 %)
	Water	Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %)
	Common practices vary across sites thus conservative process release estimates used.	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Wet scrubber for elimination of volatile components from waste gases, or, Filtration aids
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19		
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
Amount used		50 mL/min (PROC11)
Frequency and duration of use	Exposure duration per day	< 8 h(except PROC11, PROC19)
	Exposure duration per day	< 150 min(Critical for: PROC11)
	Exposure duration per day	< 15 min(Critical for: PROC19)
	Frequency of use	< 240 days/year(except PROC11)
	Frequency of use	4 - 5 days/week(Critical for: PROC11)
Human factors not influenced by risk management	Exposed skin area	Palm of one Hand 240 cm² (PROC1, PROC3, PROC15)
	Exposed skin area	Palms of both hands 480 cm² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14)
	Exposed skin area	Two hands 960 cm² (PROC8a, PROC10)
	Exposed skin area	Hands and forearms. 1980 cm² (PROC19)
	Exposed skin area	Whole body (PROC11)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes activities are at ambient temperature.	
	Room size	100 - 1000 m3(PROC11)
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a, PROC10)	
	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out by more than one worker. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Clean equipment and the work area every day. Ensure that the task is not carried out overhead.(PROC11)	
Conditions and measures related to personal protection, hygiene	If no LEV: Wear respiratory protection(PROC8a, PROC10)	

and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC10, PROC11, PROC13, PROC19)
	Wear respiratory protection. (Efficiency: 40 %)(PROC11)
	In case no respiratory protection is used, a LEV with adequate effectiveness is required.(PROC11)
	Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11)

3. Exposure estimation and reference to its source

Environment

ECETOC TRA worker v3. CEPE spERC 8a.n.v1 has been used to evaluate the exposure for the environment.

Workers

PROC11: StoffenManager (inhalation exposure)

PROC11: RISKOFDERM

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19: ECETOC TRA Version 2 with modifications has been used

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,03mg/m3	0,0007
PROC1, PROC3, PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,003
PROC2, PROC8a, PROC10, PROC15	---	Worker - inhalative, long-term - local and systemic.	12,94mg/m³	0,37
PROC2, PROC13	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,01
PROC3	---	Worker - inhalative, long-term - local and systemic.	7,76mg/m³	0,22
PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14	---	Worker - inhalative, long-term - local and systemic.	25,88mg/m³	0,74
PROC4, PROC8b, PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg bw/day	0,06
PROC5, PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg bw/day	0,13
PROC10	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03
PROC11	---	Worker - inhalative, long-term - local and systemic.	14,05mg/m³	0,4
PROC11	---	Worker - dermal, long-term - systemic	53,75mg/kg bw/day	0,51
PROC14	---	Worker - dermal, long-term - systemic	3,43mg/kg bw/day	0,03
PROC19	---	Worker - inhalative, long-term - local and systemic.	6,47mg/m³	0,18
PROC19	---	Worker - dermal, long-term - systemic	14,14mg/kg bw/day	0,13

The exposure estimate represents the 75th percentile of the exposure distibution. PROC11.

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.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
For scaling see: http://www.ecetoc.org/tra with exception for PROC11
Please note that modified version has been used (see exposure estimates).
Scaling for PROC11 (dermal) http://www.eurofins.com/riskofderm.aspx
Scaling for PROC11 (inhalation) https://www.stoffenmanager.nl/default.as

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.