SAFETY DATA SHEET

according to REACH Regulation (EC) No. 1907/2006, as amended by UK REACH Regulations SI 2019/758

2-Ethylhexanol
10050

Version / Revision	8.01	**Revision Date**	25-Jan-2023
Supersedes Version	8.00***	**Issuing date**	25-Jan-2023

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

1.1. Product identifier

Identification of the substance/preparation **2-Ethylhexanol**

CAS-No 104-76-7
EC No. 203-234-3

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

Identified uses
Formulation
coatings
cleaning agent
Dilution of a concentrate
Oil field drilling and production operations
Functional Fluids
Intermediate

Uses advised against None

1.3. Details of the supplier of the safety data sheet

Company/Undertaking Identification
OQ Chemicals GmbH
Rheinpromenade 4A
D-40789 Monheim
Germany

Product Information
Product Stewardship
FAX: +49 (0)208 693 2053
email: sc.psq@oq.com

1.4. Emergency telephone number

Emergency telephone number
+44 (0) 1235 239 670 (UK)
available 24/7

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified based on Directive 1272/2008/EC and its amendments (CLP Regulation)

Acute inhalation toxicity Category 4, H332
Skin corrosion/irritation Category 2, H315
Serious eye damage/eye irritation Category 2, H319
Target Organ Systemic Toxicant - Single exposure Category 3, H335

Additional information
For full text of Hazard- and EU Hazard-statements see SECTION 16.

2.2. Label elements

Labelling according to Regulation 1272/2008/EC and its amendments (CLP Regulation).

Hazard pictograms

Signal word **Warning**

Hazard statements
H332: Harmful if inhaled.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H335: May cause respiratory irritation.

Precautionary statements
P261: Avoid breathing gas/mist/vapours.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312: Call a POISON CENTRE/doctor if you feel unwell.

2.3. Other hazards

Vapour/air-mixtures are explosive at intense warming
Components of the product may be absorbed into the body by inhalation, ingestion and through the skin

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

Endocrine disrupting assessments The substance is not listed on the candidate list according to Art. 59(1), REACh. The substance was not assessed as having endocrine disrupting properties according to regulation 2017/2100/EU or 2018/605/EU.

SECTION 3: Composition / information on ingredients

3.1. Substances

Component	CAS-No	1272/2008/EC	Concentration (%)
2-Ethylhexan-1-ol	104-76-7	Acute Tox. 4; H332 Skin Irrit. 2; H315 Eye Irrit. 2; H319 STOT SE 3; H335 ATE = 1,1 mg/L (inhalation) (dust/mist)	> 99,5

For full text of Hazard- and EU Hazard-statements see SECTION 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Keep at rest. Aerate with fresh air. When symptoms persist or in all cases of doubt seek medical advice.

Skin
Wash off immediately with soap and plenty of water. When symptoms persist or in all cases of doubt seek medical advice.

Eyes
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Immediate medical attention is required.

Ingestion
Call a physician immediately. Do not induce vomiting without medical advice.

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

Main symptoms
cough, headache, weakness, dizziness, gastrointestinal discomfort, nausea, unconsciousness, shortness of breath.

Special hazard
Lung irritation.

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

General advice
Remove contaminated, soaked clothing immediately and dispose of safely. First aider needs to protect himself.

Treat symptomatically. If ingested, irrigate the stomach using activated charcoal.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
foam, dry chemical, carbon dioxide (CO2), water spray

Unsuitable Extinguishing Media
Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of:
carbon monoxide (CO)
carbon dioxide (CO2)
Combustion gases of organic materials must in principle be graded as inhalation poisons
Vapours are heavier than air and may spread along floors
Vapour/air-mixtures are explosive at intense warming

5.3. Advice for firefighters

Special protective equipment for firefighters
Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

Precautions for firefighting
Cool containers / tanks with water spray. Dike and collect water used to fight fire. Keep people away from and upwind of fire.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: For personal protective equipment see section 8. Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition.
For emergency responders: Personal protection see section 8.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

6.3. Methods and material for containment and cleaning up

Methods for containment
Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

Methods for cleaning up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Further info may be available in the appropriate Exposure scenarios in the annex to this SDS.

Advice on safe handling
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on the protection of the environment
See Section 8: Environmental exposure controls.

Incompatible products
strong oxidizing agents

7.2. Conditions for safe storage, including any incompatibilities

Advice on protection against fire and explosion

Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material. Vapour/air-mixtures are explosive at intense warming.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Keep at temperatures between 0 and 49 °C (32 and 120 °F).

Suitable material
stainless steel

Unsuitable material
None known

Temperature class
T3

7.3. Specific end use(s)

Formulation
coatings
cleaning agent
Dilution of a concentrate
Oil field drilling and production operations
Functional Fluids
Intermediate
For specific end use information see the annex of this safety data sheet

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits European Union

Directive 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU

Component	TWA (mg/m³)	TWA (ppm)	STEL (mg/m³)	STEL (ppm)	Skin Absorption
2-Ethylhexan-1-ol CAS: 104-76-7	5.4	1			

Exposure limits UK

EH40 WELs

Component	TWA (mg/m³)	TWA (ppm)	STEL (mg/m³)	STEL (ppm)
2-Ethylhexan-1-ol CAS: 104-76-7	5.4	1		

Note
For details and further information please refer to the original regulation.

DNEL & PNEC

2-Ethylhexan-1-ol, CAS: 104-76-7

Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	12,8 mg/m³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	53,2 mg/m³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	53,2 mg/m³
DN(M)EL - long-term exposure - systemic effects - Dermal	23 mg/kg bw/day
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	No hazard identified
DN(M)EL - long-term exposure - local effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - local effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - local effects - eyes	Medium hazard (no threshold derived)

General population

DN(M)EL - long-term exposure - systemic effects - Inhalation	2,3 mg/m³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	26,6 mg/m³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	26,6 mg/m³
DN(M)EL - long-term exposure - systemic effects - Dermal	11,4 mg/kg bw/day
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	No hazard identified
DN(M)EL - long-term exposure - local effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - local effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Oral	1,1 mg/kg bw/day
DN(M)EL - acute / short-term exposure - systemic effects - Oral	No hazard identified
DN(M)EL - local effects - eyes	Medium hazard (no threshold derived)

Environment

PNEC aqua - freshwater	0,017 mg/l
PNEC aqua - marine water	0,0017 mg/l
PNEC aqua - intermittent releases	0,17 mg/l
PNEC STP	10 mg/l
PNEC sediment - freshwater	0,284 mg/kg dw
PNEC sediment - marine water	0,0284 mg/kg dw
PNEC Air	No hazard identified
PNEC soil	0,047 mg/kg dw
PNEC oral	55 mg/kg

8.2. Exposure controls

Special adaptations (REACh)
Not applicable.

Appropriate Engineering controls
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General industrial hygiene practice
Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Eye protection
Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.
Equipment should conform to EN 166

Hand protection
Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Suitable material	nitrile rubber
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,55 mm
Break through time	> 480 min

Suitable material	polyvinylchloride
Evaluation	Information derived from practical experience
Glove thickness	approx 0,8 mm

Skin and body protection
Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Respiratory protection
Respirator with A filter. Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus. Equipment should conform to EN 136 or EN 140 and EN 143.

Environmental exposure controls
If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

Additional advice
Further details on substance data can be found in the registration dossier under the following link: http://echa.europa.eu/information-on-chemicals/registered-substances. For specific exposure controls see the annex to this safety data sheet.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	liquid @ 20 °C (68 °F)
Colour	colourless
Odour	slight
Odour threshold	0,08 ppm
Melting point/freezing point	-89 °C (Pour point)
Method	DIN ISO 3016
Boiling point or initial boiling point and boiling range	184 °C @ 1013 hPa
Method	OECD 103
Flammability	Even if not classified as flammable, the product is capable of catching fire or being set on fire.***
Lower explosion limit	0,79 Vol %
Upper explosion limit	12,7 Vol %
Flash point	77 °C @ 1013 hPa
Method	ISO 2719
Autoignition temperature	280 °C @ 1017 hPa
Method	DIN 51794
Decomposition temperature	No data available
pH	5,8 (0,9 g/l in water @ 20 °C (68 °F)) OECD 105
Kinematic Viscosity	11,833 mm²/s @ 20 °C
Method	DIN 51562
Solubility	0,9 g/l @ 20 °C, in water, OECD 105
Partition coefficient n-octanol/water (log value)	2,9 (measured) OECD 117

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
0,93	0,093	0,00091	20	68	OECD 104
3,8	0,38	0,003750	50	122	OECD 104

Density and/or relative density

Values	@ °C	@ °F	Method
0,832	20	68	DIN 51757

Relative vapour density	4,5 (Air = 1) @ 20 °C (68 °F)
Particle characteristics	not applicable

9.2. Other information

Explosive properties	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
Oxidizing properties	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Molecular weight	130,23
Molecular formula	C8 H18 O
log Koc	2,12 calculated
Dissociation constant	pKa 15,75 @ 25 °C (77 °F) (calculated)
Refractive index	1,431 @ 20 °C
Surface tension	47 mN/m (0,81 g/l @ 20°C (68°F)), OECD 115
Evaporation rate	No data available

SECTION 10: Stability and Reactivity

10.1. Reactivity

The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials

strong oxidizing agents.

10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Likely routes of exposure Ingestion, Inhalation, Eye contact, Skin contact

Acute toxicity				
2-Ethylhexan-1-ol (104-76-7)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	~2047 mg/kg	rat, male	OECD 401
Dermal	LD0	> 3000 mg/kg	rat, male/female	OECD 402
Inhalative	LC50	> 0,89 - < 5,3 mg/l (4h)	rat, male/female	OECD 403

2-Ethylhexan-1-ol, CAS: 104-76-7
Assessment
The available data lead to the classification given in section 2

Irritation and corrosion				
2-Ethylhexan-1-ol (104-76-7)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	severe irritation	OECD 404	4h
Eyes	rabbit	irritating	OECD 405	
Respiratory tract	human	irritating		

2-Ethylhexan-1-ol, CAS: 104-76-7
Assessment
The available data lead to the classification given in section 2

Sensitization				
2-Ethylhexan-1-ol (104-76-7)				
Target Organ Effects	Species	Evaluation	Method	
Skin	Human experience	not sensitizing	Maximisation Test	

2-Ethylhexan-1-ol, CAS: 104-76-7

Assessment

Based on available data, the classification criteria are not met for:
Skin sensitization
For respiratory sensitization, no data are available

Subacute, subchronic and prolonged toxicity				
2-Ethylhexan-1-ol (104-76-7)				
Type	Dose	Species	Method	
Subchronic toxicity	NOEL: 125 mg/kg/d (90d)	rat, male/female	OECD 408	Oral
Subchronic toxicity	NOAEL: 250 mg/kg/d (90d)	rat, male/female	OECD 408	Oral
Subchronic toxicity	NOEL: 125 mg/kg/d (90d)	mouse, male/female	OECD 408	Oral
Subchronic toxicity	NOAEL: 250 mg/kg/d (90d)	mouse, male/female	OECD 408	Oral
Subchronic toxicity	NOAEC: 120 ppm (90 d)	rat, male/female	OECD 413	Inhalation

2-Ethylhexan-1-ol, CAS: 104-76-7

Assessment

Based on available data, the classification criteria are not met for:
STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity					
2-Ethylhexan-1-ol (104-76-7)					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	OECD 471 (Ames)	In vitro study
Mutagenicity		Escherichia coli	negative	OECD 472	In vitro study
Mutagenicity		CHO (Chinese Hamster Ovary) cells	negative	OECD 473 (Chromosomal Aberration)	In vitro study
Mutagenicity		mouse lymphoma cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Carcinogenicity	NOAEL 500 mg/kg/d	rat, male/female	negative	OECD 451, Oral	
Carcinogenicity	NOAEL 750 mg/kg/d	mouse male/female	negative	OECD 451, Oral	
Mutagenicity		CHO (Chinese Hamster Ovary) cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Mutagenicity		mouse	negative	OECD 474	in vivo
Reproductive toxicity	NOAEL 10000 mg/kg/d	rat, parental		OECD 416 Oral	Fertility read across
Reproductive toxicity	NOAEL 3000 mg/kg/d	rat, parental		OECD 416 Oral	Maternal toxicity read across
Reproductive toxicity	NOAEL 3000 mg/kg/d	rat		OECD 416 Oral	Developmental toxicity read across
Developmental Toxicity	NOAEL 191 mg/kg/d	mouse	negative	OECD 414, Oral	Maternal toxicity, Developmental

					toxicity, Teratogenicity
Developmental Toxicity	NOAEC: 850 mg/m³	rat		OECD 414, Inhalative	Maternal toxicity, Developmental toxicity, Teratogenicity
Developmental Toxicity	NOAEL 840 mg/kg/d	rat		OECD 414, Dermal	Maternal toxicity
Developmental Toxicity	NOAEL 2520 mg/kg/d	rat		OECD 414, Dermal	Developmental toxicity, Teratogenicity

2-Ethylhexan-1-ol, CAS: 104-76-7
CMR Classification
The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B
Evaluation
Based on available data, the classification criteria are not met for:
Mutagenicity
Developmental toxicity
Reproductive toxicity
Carcinogenicity

2-Ethylhexan-1-ol, CAS: 104-76-7
Main symptoms
cough, headache, weakness, dizziness, gastrointestinal discomfort, nausea, unconsciousness, shortness of breath.
Target Organ Systemic Toxicant - Single exposure
respiratory system
The available data lead to the classification given in section 2
Target Organ Systemic Toxicant - Repeated exposure
Based on available data, the classification criteria are not met for:
STOT RE
Aspiration toxicity
no data available

11.2. Information on other hazards

Endocrine disrupting properties
The substance has not been identified as having endocrine disrupting properties in accordance with section 2.3.
2-Ethylhexan-1-ol, CAS: 104-76-7
Other adverse effects
Components of the product may be absorbed into the body by inhalation, ingestion and through the skin.
Note
Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link:
http://echa.europa.eu/information-on-chemicals/registered-substances.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity
2-Ethylhexan-1-ol (104-76-7)

Species	Exposure time	Dose	Method
Leuciscus idus (Golden orfe)	96h	LC50: 17,1 mg/l	84/449/EEC C.1
Pimephales promelas (fathead minnow)	96h	LC50: 28,2 mg/l	OECD 203
Daphnia magna (Water flea)	48h	EC50: 39 mg/l	84/449/EEC C.2
Desmodesmus subspicatus	72h	EC50: 11,5 mg/l (Biomass)	88/302/EEC C.3
Desmodesmus subspicatus	72h	EC50: 16,6 mg/l (Growth rate)	88/302/EEC C.3
Activated sludge (domestic)	24h	NOEC: > 300 mg/l	ETAD Fermentation tube method

Long term toxicity				
2-Ethylhexan-1-ol (104-76-7)				
Type	Species	Dose	Method	
Aquatic toxicity	Scenedesmus subspicatus	EC10: 3,2 mg/l (72 h) Biomass	88/302/EEC C.3	
Aquatic toxicity	Scenedesmus subspicatus	EC10: 5,3 mg/l (72 h) Growth rate	88/302/EEC C.3	

12.2. Persistence and degradability

2-Ethylhexan-1-ol, CAS: 104-76-7
Biodegradation
100 % (14 d), activated sludge, non-adapted, aerobic, OECD 301 C,
97 % (7 d), activated sludge, industrial, non-adapted, aerobic, OECD 302 B (Zahn-Wellens Test).

Abiotic Degradation		
2-Ethylhexan-1-ol (104-76-7)		
Type	Result	Method
Hydrolysis	No data available	
Photolysis	Rate constant: 1,13 x 10^(-11) cm^3/(molecule x s) Atmospheric lifetime: 24,6 h	measured

12.3. Bioaccumulative potential

2-Ethylhexan-1-ol (104-76-7)		
Type	Result	Method
log Pow	2,9 @ 25 °C (77 °F)	measured, OECD 117
BCF	38	calculated

12.4. Mobility in soil

2-Ethylhexan-1-ol (104-76-7)		
Type	Result	Method
Adsorption/Desorption	Koc: 131,1 @ 20 °C	calculated
Surface tension	47 mN/m (0,81 g/l @ 20°C (68°F))	OECD 115
Distribution to environmental compartments	no data available	

12.5. Results of PBT and vPvB assessment

2-Ethylhexan-1-ol, CAS: 104-76-7
PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)

12.6. Endocrine disrupting properties

The substance has not been identified as having endocrine disrupting properties in accordance with section 2.3.

12.7. Other adverse effects

2-Ethylhexan-1-ol, CAS: 104-76-7
No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product Information
Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.
Hazardous waste according to European Waste Catalogue (EWC)

Uncleaned empty packaging
Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

Section 14.1 - 14.6

ADR/RID	Not restricted
ADN	ADN Container Not restricted
ADN	ADN Tanker
14.1. UN number or ID number	ID 9003
14.2. UN proper shipping name	Substances with a flashpoint between 60 °C and not more than 100 °C (2-Ethylhexanol)
14.3. Transport hazard class(es)	9
Subsidiary Risk	N3, F
14.4. Packing group	-
14.5. Environmental hazards	no
14.6. Special precautions for user	no data available

ICAO-TI / IATA-DGR Not restricted

IMDG Not restricted

14.7. Maritime transport in bulk according to IMO instruments

Product name	Octanol
Ship type	2
Pollution category	Y
Hazard class	P

SECTION 15: Regulatory information

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

Regulation 1272/2008, Annex VI
not listed

DI 2012/18/EU (Seveso III)
Category not subject

DI 1999/13/EC (VOC Guideline)

Component	Status
2-Ethylhexan-1-ol CAS: 104-76-7	regulated

The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 No. 758

Component	Status
2-Ethylhexan-1-ol CAS: 104-76-7	The substance is/will be pre-registered

For details and further information please refer to the original regulation.

International Inventories

2-Ethylhexan-1-ol, CAS: 104-76-7
AICS (AU)
DSL (CA)
IECSC (CN)
EC-No. 2032343 (EU)
ENCS (2)-217 (JP)
ISHL (2)-217 (JP)
KECI KE-13766 (KR)
INSQ (MX)
PICCS (PH)
TSCA (US)
NZIoC (NZ)
TCSI (TW)

National regulatory information Great Britain

Releases to air (Pollution Inventory Substances)
not subject

Releases to water (Pollution Inventory Substances)
not subject

Releases to sewer (Pollution Inventory Substances)
not subject
For details and further information please refer to the original regulation

15.2. Chemical safety assessment

The Chemical Safety Report (CSR) has been generated. For Exposure Scenarios see the annex.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H332: Harmful if inhaled.
H335: May cause respiratory irritation.

Abbreviations
A table of terms and abbreviations can be found under the following link:
http://echa.europa.eu/documents/10162/13632/information_requirements_r20_en.pdf

Training advice
For effective first-aid, special training / education is needed.

Sources of key data used to compile the datasheet
Information contained in this safety data sheet is based on OQ owned data and public sources deemed valid or acceptable. The absence of data elements required by OSHA, ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

Further information for the safety data sheet
Changes against the previous version are marked by ***. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the OQ homepage (www.chemicals.oq.com).

Disclaimer
For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. OQ Chemicals makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.

End of Safety Data Sheet

Annex to the extended Safety Data Sheet (eSDS)

General information
A quantitative approach used to conclude safe use for:
Environmental compartment
Long-term Systemic effects via inhalation
Acute local hazards via inhalation
Long-term Systemic effects via skin
A qualitative approach used to conclude safe use for:
Acute systemic hazards via inhalation
Long-term local effects via skin
Acute local hazards via skin
Local hazards via eyes

Other combinations of operational conditions may also be safe. Please contact OQ in case your local operational conditions differ from the ones described below and you are unsure if they are also safe
For consumer applications in the following usage areas please contact OQ (sc.psq@oq.com):

Operational conditions and risk management measures
Following operational conditions and risk management measures, are based on qualitative risk characterisation:
Minimize number of staff exposed
Good standard of personal hygiene
Minimization of manual phases
Avoidance of contact with contaminated tools and objects
Regular cleaning of work area
Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Training for staff on good practice
Good standard of general ventilation
Substance/task appropriate gloves
Skin coverage with appropriate barrier material based on potential for contact with chemicals
Eye protection
Face-shield

Exposure scenario identification

1 **Formulation & (re)packing of substances and mixtures**
2 **Uses in coatings**
3 **Uses in coatings**
4 **Use in Cleaning Products**
5 **Dilution of a concentrate**
6 **Use in Oil and Gas field drilling and production operations**
7 **Functional Fluids**
8 **Functional Fluids**
9 **Industrial use resulting in manufacture of another substance (use of intermediates)**

Number of the ES 1

Short title of the exposure scenario
Formulation & (re)packing of substances and mixtures

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15: Use as laboratory reagent

Environmental release categories [ERC]
ERC2: Formulation of preparations (mixtures)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
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, maintenanance and associated laboratory activities.

Further explanations
Industrial use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently).
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 2

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 2.2.v1 (ESVOC 4).
Amounts used
Daily amount per site: 0.8 to
Annual amount per site: 240 to
Fraction of Regional tonnage used locally: 1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.5 %
Release fraction to wastewater from process: 0.2 %
Release fraction to soil from process: 0.01%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88

Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario 2
Contributing exposure scenario controlling worker exposure for PROC 1

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 3
Contributing exposure scenario controlling worker exposure for PROC 2

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 4
Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 5
Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 6
Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 9
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 10
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 11
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 12
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 13
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)

Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **14**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **15**
Contributing exposure scenario controlling worker exposure for
PROC 9

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **16**
Contributing exposure scenario controlling worker exposure for
PROC 9

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **17**
Contributing exposure scenario controlling worker exposure for
PROC 9

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **18**
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **19**
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.012 mg/l; RCR: 0.717
Fresh Water (Sediment)	PEC: 0.204 mg/kg dw; RCR: 0.717
Marine Water (Pelagic)	PEC: 0.001 mg/l; RCR: 0.7
Marine Water (Sediment)	PEC: 0.02 mg/kg dw; RCR: 0.701
Agricultural Soil	PEC: 0.027 mg/kg dw; RCR: 0.582
Sewage Treatment Plant (Effluent)	PEC: 0.093 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.39 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.037 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.02 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.014 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 0.001 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 0.002 mg/kg bw/day; RCR: 0.001
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. EE(inhal): Estimated inhalative exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.217; EE(derm): 0.007
Proc 2	EE(inhal): 5.4263; EE(derm): 0.274
Proc 3	EE(inhal): 11.39; EE(derm): 0.138 - Contributing Scenarios 4
	EE(inhal): 1.628; EE(derm): 0.138 - Contributing Scenarios 5
	EE(inhal): 1.628; EE(derm): 0.138 - Contributing Scenarios 6
Proc 5	EE(inhal): 8.139; EE(derm): 2.742 - Contributing Scenarios 7
	EE(inhal): 2.713; EE(derm): 0.742 - Contributing Scenarios 8
	EE(inhal): 2.713; EE(derm): 2.742 - Contributing Scenarios 9
Proc 8a	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 10
	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 11
Proc 8b	EE(inhal): 8.139; EE(derm): 2.742 - Contributing Scenarios 12
	EE(inhal): 2.713; EE(derm): 2.742 - Contributing Scenarios 13
	EE(inhal): 1.357; EE(derm): 2.742 - Contributing Scenarios 14
Proc 9	EE(inhal): 8.139; EE(derm): 1.372 - Contributing Scenarios 15
	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 16
	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 17
Proc 15	EE(inhal): 8.139; EE(derm): 0.068 - Contributing Scenarios 18
	EE(inhal): 2.713; EE(derm): 0.068 - Contributing Scenarios 19

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.424; RCR(derm): 0.012
Proc 3	RCR(inhal): 0.89; RCR(derm): 0.01 - Contributing Scenarios 4
	RCR(inhal): 0.127; RCR(derm): 0.01 - Contributing Scenarios 5
	RCR(inhal): 0.127; RCR(derm): 0.01 - Contributing Scenarios 6
Proc 5	RCR(inhal): 0.636; RCR(derm): 0.019 - Contributing Scenarios 7
	RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 8
	RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 9
Proc 8a	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 10
	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 11
Proc 8b	RCR(inhal): 0.636; RCR(derm): 0.119 - Contributing Scenarios 12
	RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 13
	RCR(inhal): 0.106; RCR(derm): 0.119 - Contributing Scenarios 14
Proc 9	RCR(inhal): 0.636; RCR(derm): 0.06 - Contributing Scenarios 15
	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 16
	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 17
Proc 15	RCR(inhal): 0.636; RCR(derm): 0.01 - Contributing Scenarios 18
	RCR(inhal): 0.212; RCR(derm): 0.01 - Contributing Scenarios 19

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.00110 mg/l; RCR: 0.06458
Fresh Water (Sediment)	PEC: 0.00864 mg/kg dw; RCR: 0.03087
Marine Water (Pelagic)	PEC: 0.00010 mg/l; RCR: 0.05618
Marine Water (Sediment)	PEC: 0.00075 mg/kg dw; RCR: 0.02685
Agricultural Soil	PEC: 0.00007 mg/kg dw; RCR: 0.00157
Sewage Treatment Plant (Effluent)	PEC: 0.00078 mg/l; RCR: 0.00008

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.0543 ; EE(derm): 0.3429
Proc 2	EE(inhal): 5.4263 ; EE(derm): 1.3714
Proc 3	EE(inhal): 16.2788 ; EE(derm): 0.3429
Proc 4	EE(inhal): 27.1313 ; EE(derm): 6.8571
Proc 8a	EE(inhal): 5.4263 ; EE(derm): 6.8571
Proc 8b	EE(inhal): 27.1313 ; EE(derm): 6.8571
Proc 9	EE(inhal): 27.1313 ; EE(derm): 6.8571
Proc 15	EE(inhal): 27.1313 ; EE(derm): 0.3429

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.0010 ; RCR(derm): 0.0149
Proc 2	RCR(inhal): 0.102 ; RCR(derm): 0.0596
Proc 3	RCR(inhal): 0.3060 ; RCR(derm): 0.0149
Proc 4	RCR(inhal): 0.5100 ; RCR(derm): 0.2981
Proc 8a	RCR(inhal): 0.1020 ; RCR(derm): 0.2981
Proc 8b	RCR(inhal): 0.5100 ; RCR(derm): 0.2981
Proc 9	RCR(inhal): 0.5100 ; RCR(derm): 0.2981
Proc 15	RCR(inhal): 0.5100 ; RCR(derm): 0.0149

Number of the ES 2

Short title of the exposure scenario
Uses in coatings

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)
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
PROC15: Use as laboratory reagent

Environmental release categories [ERC]
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Covers the use in coatings (paints, inks, adhesives, etc) within closed or contained systems including incidental exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application activities and film formation) and equipment cleaning, maintenance and associated laboratory activities.

Further explanations
Industrial use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 4

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 4.3a.v1 (ESVOC 5).
Amounts used
Daily amount per site: 0.22 to
Annual amount per site: 66 to
Fraction of Regional tonnage used locally: 1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 98%
Release fraction to wastewater from process: 0.7%
Release fraction to soil from process: 0%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 1

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for
PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **4**
Contributing exposure scenario controlling worker exposure for
PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 5

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **6**
Contributing exposure scenario controlling worker exposure for PROC 7

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **7**
Contributing exposure scenario controlling worker exposure for PROC 7

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **8**
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **9**
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **10**
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **13**

Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 14
Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 15
Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 16
Contributing exposure scenario controlling worker exposure for PROC 10

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 17
Contributing exposure scenario controlling worker exposure for PROC 10

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 18
Contributing exposure scenario controlling worker exposure for PROC 13

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 19
Contributing exposure scenario controlling worker exposure for PROC 13

Product characteristics
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 20
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker

provide a good standard of controlled ventilation (5 to 10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374

Number of the contributing scenario **21**

Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour) Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal)
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.012 mg/l; RCR: 0.696
Fresh Water (Sediment)	PEC: 0.198 mg/kg dw; RCR: 0.696
Marine Water (Pelagic)	PEC: 0.001 mg/l; RCR: 0.68
Marine Water (Sediment)	PEC: 0.019 mg/kg dw; RCR: 0.68
Agricultural Soil	PEC: 0.034 mg/kg dw; RCR: 0.724
Sewage Treatment Plant (Effluent)	PEC: 0.09 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.382 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.037 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.019 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.027 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 0.05 mg/m³; RCR: 0.022
Man via environment – Oral	Exposure via food consumption: 0.004 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.025

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects. EE(derm): Estimated dermal exposure [mg/kg b.w./d].

Proc 1	EE(inhal): 0.13; EE(derm): 0.004
Proc 2	EE(inhal): 3.256; EE(derm): 0.164
Proc 3	EE(inhal): 9.767; EE(derm): 0.083
Proc 5	EE(inhal): 1.628; EE(derm): 1.645
Proc 7	EE(inhal): 1.628; EE(derm): 5.143 - Contributing Scenarios 6
	EE(inhal): 5.426; EE(derm): 1.714 - Contributing Scenarios 7
Proc 8a	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 8
	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 9
Proc 8b	EE(inhal): 4.884; EE(derm): 1.645 - Contributing Scenarios 10
	EE(inhal): 1.628; EE(derm): 1.645 - Contributing Scenarios 11
	EE(inhal): 0.814; EE(derm): 1.645 - Contributing Scenarios 12
Proc 9	EE(inhal): 4.884; EE(derm): 0.823 - Contributing Scenarios 13
	EE(inhal): 1.628; EE(derm): 0.823 - Contributing Scenarios 14
	EE(inhal): 1.628; EE(derm): 0.823 - Contributing Scenarios 15

Proc 10	EE(inhal): 3.256; EE(derm): 3.292 - Contributing Scenarios 16
	EE(inhal): 3.256; EE(derm): 3.292 - Contributing Scenarios 17
Proc 13	EE(inhal): 9.767; EE(derm): 1.645 - Contributing Scenarios 18
	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 19
Proc 15	EE(inhal): 4.884; EE(derm): 0.041 - Contributing Scenarios 20
	EE(inhal): 1.628; EE(derm): 0.041 - Contributing Scenarios 21

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.254; RCR(derm): 0.01
Proc 3	RCR(inhal): 0.763; RCR(derm): 0.01
Proc 5	RCR(inhal): 0.127; RCR(derm): 0.072
Proc 7	RCR(inhal): 0.127; RCR(derm): 0.224 - Contributing Scenarios 6
	RCR(inhal): 0.424; RCR(derm): 0.075 - Contributing Scenarios 7
Proc 8a	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 8
	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 9
Proc 8b	RCR(inhal): 0.382; RCR(derm): 0.072 - Contributing Scenarios 10
	RCR(inhal): 0.127; RCR(derm): 0.072 - Contributing Scenarios 11
	RCR(inhal): 0.064; RCR(derm): 0.072 - Contributing Scenarios 12
Proc 9	RCR(inhal): 0.0382; RCR(derm): 0.036 - Contributing Scenarios 13
	RCR(inhal): 0.127; RCR(derm): 0.036 - Contributing Scenarios 14
	RCR(inhal): 0.127; RCR(derm): 0.036 - Contributing Scenarios 15
Proc 10	RCR(inhal): 0.254; RCR(derm): 0.143 - Contributing Scenarios 16
	RCR(inhal): 0.254; RCR(derm): 0.143 - Contributing Scenarios 17
Proc 13	RCR(inhal): 0.763; RCR(derm): 0.072 - Contributing Scenarios 18
	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 19
Proc 15	RCR(inhal): 0.0.382; RCR(derm): 0.01 - Contributing Scenarios 20
	RCR(inhal): 1.628; RCR(derm): 0.041 - Contributing Scenarios 21

Number of the ES 3

Short title of the exposure scenario

Uses in coatings

List of use descriptors

Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10: Roller application or brushing
PROC11: Non industrial spraying
PROC13: Treatment of articles by dipping and pouring

PROC15: Use as laboratory reagent
PROC19: Hand-mixing with intimate contact and only PPE available

Environmental release categories [ERC]
ERC8a: Wide dispersive indoor use of processing aids in open systems
ERC8d: Wide dispersive outdoor use of processing aids in open systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
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

Further explanations
Professional use
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented

Contributing Scenarios

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 8a ERC 8d

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 8.3b.v1.
Amounts used
daily wide dispersive use: 0.003 to/d
Fraction of EU tonnage used in region: 1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 98 %
Release fraction to wastewater from process: 1 %
Release fraction to soil from process: 1%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 1

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **4**
Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Covers percentage substance in the product: 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **6**
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal). provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal). provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 10

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal). provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 9
Contributing exposure scenario controlling worker exposure for PROC 10

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 10
Contributing exposure scenario controlling worker exposure for PROC 11

Product characteristics

Liquid
Covers percentage substance in the product: 5 %
Frequency and duration of use
4 h (half shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for PROC 11

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
4 h (half shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for PROC 13

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **13**
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).

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

Number of the contributing scenario **14**
Contributing exposure scenario controlling worker exposure for PROC 19

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **15**
Contributing exposure scenario controlling worker exposure for PROC 11

Product characteristics
Covers percentage substance in the product up to 5 %
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection (Efficiency: 90 %).

Exposure estimation and reference to its source

Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.003 mg/l; RCR: 0.179
Fresh Water (Sediment)	PEC: 0.051 mg/kg dw; RCR: 0.179
Marine Water (Pelagic)	PEC: 0.00028 mg/l; RCR: 0.0163
Marine Water (Sediment)	PEC: 0.005 mg/kg dw; RCR: 0.163
Agricultural Soil	PEC: 0.00074 mg/kg dw; RCR: 0.016
Sewage Treatment Plant (Effluent)	PEC: 0.002 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.173 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.016 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.015 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.001 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 0.00055 mg/m^3; RCR: 0.001
Man via environment – Oral	Exposure via food consumption: 0.00041 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. EE(inhal): Estimated inhalative

exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.011; EE(derm): 0.01
Proc 2	EE(inhal): 5.426; EE(derm): 0.055
Proc 3	EE(inhal): 3.256; EE(derm): 0.028
Proc 5	EE(inhal): 10.85; EE(derm): 0.548
Proc 8a	EE(inhal): 5.426; EE(derm): 0.548
Proc 8b	EE(inhal): 1.085; EE(derm): 0.548
Proc 10	EE(inhal): 5.426; EE(derm): 1.097 - Contributing Scenarios 9
	EE(inhal): 2.713; EE(derm): 1.097 - Contributing Scenarios 10
Proc 11	EE(inhal): 6,511; EE(derm): 24.286 - Contributing Scenarios 11
	EE(inhal): 10.85; EE(derm): 2.143 - Contributing Scenarios 15
Proc 13	EE(inhal): 2.17; EE(derm): 0.548
Proc 15	EE(inhal): 1.085; EE(derm): 0.014
Proc 19	EE(inhal): 2.713; EE(derm): 2.829

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.424; RCR(derm): 0.01
Proc 3	RCR(inhal): 0.254; RCR(derm): 0.01
Proc 5	RCR(inhal): 0.848; RCR(derm): 0..024
Proc 8a	RCR(inhal): 0.424; RCR(derm): 0.024
Proc 8b	RCR(inhal): 0.085; RCR(derm): 0.024
Proc 10	RCR(inhal): 0.424; RCR(derm): 0.048 - Contributing Scenarios 8
	RCR(inhal): 0.212; RCR(derm): 0.048 - Contributing Scenarios 9
Proc 11	RCR(inhal): 0.509; RCR(derm): 0.186 - Contributing Scenarios 11
	RCR(inhal): 0.488; RCR(derm): 0.093 - Contributing Scenarios 15
Proc 13	RCR(inhal): 0.17; RCR(derm): 0.024
Proc 15	RCR(inhal): 0.085; RCR(derm): 0.01
Proc 19	RCR(inhal): 0.212; RCR(derm): 0.123

Number of the ES 4

Short title of the exposure scenario

Use in Cleaning Products

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
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

Environmental release categories [ERC]
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
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).

Further explanations
Industrial use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 4

Amounts used
Daily amount per site: 0.002 to
Annual amount per site: 0.03 to
Fraction of Regional tonnage used locally: 1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 100%
Release fraction to wastewater from process: 100%
Release fraction to soil from process: 5%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**

Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 4
Contributing exposure scenario controlling worker exposure for PROC 7

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 5
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 6
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation):

90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 9
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio
Fresh Water (Pelagic) PEC: 0.012 mg/l; RCR: 0.683

Fresh Water (Sediment)	PEC: 0.194 mg/kg dw; RCR: 0.683
Marine Water (Pelagic)	PEC: 0.001 mg/l; RCR: 0.666
Marine Water (Sediment)	PEC: 0.019 mg/kg dw; RCR: 0.666
Agricultural Soil	PEC: 0.026 mg/kg dw; RCR: 0.543
Sewage Treatment Plant (Effluent)	PEC: 0.087 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.182 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.017 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.015 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.013 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.764E-4 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 5.749E-4 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios.

Proc 2	EE(inhal): 1.085; EE(derm): 0.055
Proc 3	EE(inhal): 3.256; EE(derm): 0.028
Proc 7	EE(inhal): 10.85; EE(derm): 1.714
Proc 8a	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 5
	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 6
Proc 8b	EE(inhal): 8.139; EE(derm): 2.742 - Contributing Scenarios 7
	EE(inhal): 2.713; EE(derm): 2.742 - Contributing Scenarios 8
	EE(inhal): 1.357; EE(derm): 2.742 - Contributing Scenarios 9

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 2	RCR(inhal): 0.085; RCR(derm): 0.01
Proc 3	RCR(inhal): 0.254; RCR(derm): 0.01
Proc 7	RCR(inhal): 0.848; RCR(derm): 0.075
Proc 8a	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 5
	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 6
Proc 8b	RCR(inhal): 0.636; RCR(derm): 0.119 - Contributing Scenarios 7
	RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 8
	RCR(inhal): 0.106; RCR(derm): 0.119 - Contributing Scenarios 9

Number of the ES 5

Short title of the exposure scenario
Dilution of a concentrate

List of use descriptors

Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
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

Environmental release categories [ERC]
ERC8d: Wide dispersive outdoor use of processing aids in open systems

Product characteristics
Refer to attached safety data sheets

Further explanations
Professional use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented

Contributing Scenarios

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 8d

Amounts used
daily wide dispersive use: 0.274 to/d
Fraction of Regional tonnage used locally: 0.1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 100 %
Release fraction to wastewater from process: 100 %
Release fraction to soil from process: 20%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**

Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 4
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm^2)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 5
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 6
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **7**
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.011 mg/l; RCR: 0.64
Fresh Water (Sediment)	PEC: 0.182 mg/kg dw; RCR: 0.64
Marine Water (Pelagic)	PEC: 0.011 mg/l; RCR: 0.624
Marine Water (Sediment)	PEC: 0.018 mg/kg dw; RCR: 0.624
Agricultural Soil	PEC: 0.023 mg/kg dw; RCR: 0.498
Sewage Treatment Plant (Effluent)	PEC: 0.08 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.401 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.038 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.02 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.012 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.645E-4 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 0.001 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d].

Proc 5	EE(inhal): 10.85; EE(derm): 0.548 - Contributing Scenarios 2
	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 3
Proc 8a	EE(inhal): 2.713; EE(derm): 0.548 - Contributing Scenarios 4
	EE(inhal): 8.139; EE(derm): 1.645 - Contributing Scenarios 5
Proc 8b	EE(inhal): 10.85; EE(derm): 0.548 - Contributing Scenarios 6
	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 7

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 5	RCR(inhal): 0.848; RCR(derm): 0.024 - Contributing Scenarios 2
	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 3
Proc 8a	RCR(inhal): 0.212; RCR(derm): 0.024 - Contributing Scenarios 4
	RCR(inhal): 0.636; RCR(derm): 0.072 - Contributing Scenarios 5
Proc 8b	RCR(inhal): 0.848; RCR(derm): 0.024 - Contributing Scenarios 6
	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 7

Number of the ES 6

Short title of the exposure scenario

Use in Oil and Gas field drilling and production operations

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
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
PROC15: Use as laboratory reagent

Environmental release categories [ERC]
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance

Further explanations
Industrial use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 4

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 4.5a.v1 (ESVOC 11).
Amounts used
Daily amount per site: 0.022 to
Annual amount per site: 0.44 to

Fraction of Regional tonnage used locally: 1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.1 %
Release fraction to wastewater from process: 7 %
Release fraction to soil from process: 0%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario 2
Contributing exposure scenario controlling worker exposure for PROC 1

Product characteristics
Covers percentage substance in the product up to 5 %
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 3
Contributing exposure scenario controlling worker exposure for PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 4
Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).

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

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 5

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **6**
Contributing exposure scenario controlling worker exposure for
PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **7**
Contributing exposure scenario controlling worker exposure for
PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **8**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use

8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **9**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **10**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for
PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for
PROC 15

Product characteristics
Liquid

Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **13**
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Covers percentage substance in the product up to 5 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Outdoor use
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.012 mg/l; RCR: 0.696
Fresh Water (Sediment)	PEC: 0.198 mg/kg dw; RCR: 0.696
Marine Water (Pelagic)	PEC: 0.001 mg/l; RCR: 0.68
Marine Water (Sediment)	PEC: 0.019 mg/kg dw; RCR: 0.68
Agricultural Soil	PEC: 2.787E-4 mg/kg dw; RCR: 0.01
Sewage Treatment Plant (Effluent)	PEC: 0.09 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.182 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.017 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.015 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.001 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.542E-4 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 4.483E-4 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for short-term or long-term, systemic or local exposure depending on which lead to more conservative risk characterization ratios. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects. EE(derm): Estimated dermal exposure [mg/kg b.w./d].

Proc 1	EE(inhal): 0.011; EE(derm): 0.001
Proc 2	EE(inhal): 1.085; EE(derm): 0.055
Proc 3	EE(inhal): 3.256; EE(derm): 0.028
Proc 5	EE(inhal): 5.426; EE(derm): 0.548 - Contributing Scenarios 5
	EE(inhal): 3.798; EE(derm): 2.742 - Contributing Scenarios 13
Proc 8a	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 6
	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 7
Proc 8b	EE(inhal): 8.139; EE(derm): 2.742 - Contributing Scenarios 8
	EE(inhal): 2.713; EE(derm): 2.742 - Contributing Scenarios 9

	EE(inhal): 1.357; EE(derm): 2.742 - Contributing Scenarios 10
Proc 15	EE(inhal): 8.139; EE(derm): 0.068 - Contributing Scenarios 11
	EE(inhal): 2.713; EE(derm): 0.068 - Contributing Scenarios 12

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.085; RCR(derm): 0.01
Proc 3	RCR(inhal): 0.254; RCR(derm): 0.01
Proc 5	RCR(inhal): 0.424; RCR(derm): 0.024 - Contributing Scenarios 5
	RCR(inhal): 0.297; RCR(derm): 0.119 - Contributing Scenarios 13
Proc 8a	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 6
	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 7
Proc 8b	RCR(inhal): 0.636; RCR(derm): 0.119 - Contributing Scenarios 8
	RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 9
	RCR(inhal): 0.106; RCR(derm): 0.119 - Contributing Scenarios 10
Proc 15	RCR(inhal): 0.636; RCR(derm): 0.01 - Contributing Scenarios 11
	RCR(inhal): 0.212; RCR(derm): 0.204 - Contributing Scenarios 12

Number of the ES 7

Short title of the exposure scenario
Functional Fluids

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
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 [ERC]
ERC7: Industrial use of substances in closed systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers

Further explanations
Industrial use
Assessment tool used:

Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 7

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 7.13a.v1 (ESVOC 31).
Amounts used
Daily amount per site: 4.48 to
Annual amount per site: 90 to
Fraction of Regional tonnage used locally: 1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.1 %
Release fraction to wastewater from process: 0.03 %
Release fraction to soil from process: 0.1%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 1

Further specification
Assessment tool used: Chesar 2.2
Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 4
Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 5
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 6
Contributing exposure scenario controlling worker exposure for PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %

Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **8**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **9**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **10**
Contributing exposure scenario controlling worker exposure for
PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for

PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 12
Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 13
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 14
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Exposure estimation and reference to its source

Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.011 mg/l; RCR: 0.629
Fresh Water (Sediment)	PEC: 0.179 mg/kg dw; RCR: 0.63
Marine Water (Pelagic)	PEC: 0.001 mg/l; RCR: 0.613
Marine Water (Sediment)	PEC: 0.017 mg/kg dw; RCR: 0.613
Agricultural Soil	PEC: 0.023 mg/kg dw; RCR: 0.488
Sewage Treatment Plant (Effluent)	PEC: 0.078 mg/l; RCR: 0.001
Predator's prey (freshwater)	PEC: 0.18 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.016 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.015 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.012 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 6.221E-4 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 5.578E-4 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. EE(inhal): Estimated inhalative exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.033; EE(derm): 0.004
Proc 2	EE(inhal): 3.256; EE(derm): 0.164
Proc 3	EE(inhal): 9.767; EE(derm): 0.083
Proc 8a	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 5
	EE(inhal): 3.256; EE(derm): 1.645 - Contributing Scenarios 6
Proc 8b	EE(inhal): 4.884; EE(derm): 1.645 - Contributing Scenarios 7
	EE(inhal): 1.628; EE(derm): 1.645 - Contributing Scenarios 8
	EE(inhal): 0.814; EE(derm): 1.645 - Contributing Scenarios 9
Proc 9	EE(inhal): 4.884; EE(derm): 0.823 - Contributing Scenarios 10
	EE(inhal): 1.628; EE(derm): 0.823 - Contributing Scenarios 11
	EE(inhal): 1.628; EE(derm): 0.823 - Contributing Scenarios 12
Proc 15	EE(inhal): 0.488; EE(derm): 0.041 - Contributing Scenarios 13
	EE(inhal): 1.628; EE(derm): 0.041 - Contributing Scenarios 14

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.254; RCR(derm): 0.01
Proc 3	RCR(inhal): 0.763; RCR(derm): 0.01
Proc 8a	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 5
	RCR(inhal): 0.254; RCR(derm): 0.072 - Contributing Scenarios 6
Proc 8b	RCR(inhal): 0.382; RCR(derm): 0.072 - Contributing Scenarios 7
	RCR(inhal): 0.127; RCR(derm): 0.072 - Contributing Scenarios 8
	RCR(inhal): 0.064; RCR(derm): 0.072 - Contributing Scenarios 9
Proc 9	RCR(inhal): 0.382; RCR(derm): 0.036 - Contributing Scenarios 10
	RCR(inhal): 0.127; RCR(derm): 0.036 - Contributing Scenarios 11
	RCR(inhal): 0.127; RCR(derm): 0.036 - Contributing Scenarios 12

Proc 15	RCR(inhal): 0.038; RCR(derm): 0.01 - Contributing Scenarios 13 RCR(inhal): 0.127; RCR(derm): 0.01 - Contributing Scenarios 14

Number of the ES 8

Short title of the exposure scenario
Functional Fluids

List of use descriptors

Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
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)
PROC15: Use as laboratory reagent
PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

Environmental release categories [ERC]
ERC9a: Wide dispersive indoor use of substances in closed systems
ERC9b: Wide dispersive outdoor use of substances in closed systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers

Further explanations
Professional use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 9a ERC 9b

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 9.13b.v1 (ESVOC 32).
Amounts used
daily wide dispersive use: 0.003 to/d
Fraction of Regional tonnage used locally: 0.1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 5%
Release fraction to wastewater from process: 5%
Release fraction to soil from process: 5%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for
PROC 1

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for
PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **4**
Contributing exposure scenario controlling worker exposure for
PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for

PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 6
Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 20

Product characteristics
Liquid
Covers percentage substance in the product up to 25 %
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

Exposure estimation and reference to its source

Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.004 mg/l; RCR: 0.217
Fresh Water (Sediment)	PEC: 0.062 mg/kg dw; RCR: 0.217
Marine Water (Pelagic)	PEC: 3.404E-4 mg/l; RCR: 0.2
Marine Water (Sediment)	PEC: 0.006 mg/kg dw; RCR: 0.2
Agricultural Soil	PEC: 0.003 mg/kg dw; RCR: 0.055
Sewage Treatment Plant (Effluent)	PEC: 0.008 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.191 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.017 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.016 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.002 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.546E-4 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 4.983E-4 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d].

Proc 1	EE(inhal): 0.033; EE(derm): 0.004
Proc 2	EE(inhal): 1.628; EE(derm): 0.164
Proc 3	EE(inhal): 9.767; EE(derm): 0.083
Proc 8a	EE(inhal): 8.139; EE(derm): 1.645
Proc 9	EE(inhal): 6.511; EE(derm): 0.823
Proc 15	EE(inhal): 3.256; EE(derm): 0.041
Proc 20	EE(inhal): 3.256; EE(derm): 0.205

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.127; RCR(derm): 0.01
Proc 3	RCR(inhal): 0.763; RCR(derm): 0.01
Proc 8a	RCR(inhal): 0.636; RCR(derm): 0.072
Proc 9	RCR(inhal): 0.49; RCR(derm): 0.509
Proc 15	RCR(inhal): 0.254; RCR(derm): 0.01
Proc 20	RCR(inhal): 0.254; RCR(derm): 0.01

Exposure estimation and reference to its source

Number of the ES 9

Short title of the exposure scenario

Industrial use resulting in manufacture of another substance (use of intermediates)

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
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 [ERC]
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container).

Further explanations
Industrial use
Assessment tool used:
Chesar 2.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 6a

Further specification
Dry processes, SpERC ESVOC 6.1a.v1.
Amounts used

Daily amount per site: 0.5 to
Annual amount per site: 150 to
Fraction of Regional tonnage used locally: 0.1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.01%
Release fraction to wastewater from process: 03%
Release fraction to soil from process: 0.1%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 88
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for
PROC 1

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for
PROC 2

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **4**
Contributing exposure scenario controlling worker exposure for
PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **6**
Contributing exposure scenario controlling worker exposure for
PROC 3

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **7**
Contributing exposure scenario controlling worker exposure for
PROC 4

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **8**
Contributing exposure scenario controlling worker exposure for
PROC 4

Product characteristics
Liquid

Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **9**
Contributing exposure scenario controlling worker exposure for
PROC 4

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **10**
Contributing exposure scenario controlling worker exposure for
PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for
PROC 8a

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 13
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 14
Contributing exposure scenario controlling worker exposure for PROC 8b

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 15
Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 16
Contributing exposure scenario controlling worker exposure for

PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 17
Contributing exposure scenario controlling worker exposure for PROC 9

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 18
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 19
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Exposure estimation and reference to its source

Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.012 mg/l; RCR: 0.683
Fresh Water (Sediment)	PEC: 0.194 mg/kg dw; RCR: 0.683
Marine Water (Pelagic)	PEC: 0.001 mg/l; RCR: 0.666
Marine Water (Sediment)	PEC: 0.019 mg/kg dw; RCR: 0.666
Agricultural Soil	PEC: 0.026 mg/kg dw; RCR: 0.543
Sewage Treatment Plant (Effluent)	PEC: 0.087 mg/l; RCR: 0.01
Predator's prey (freshwater)	PEC: 0.376 mg/kg ww; RCR: 0.01
Predator's prey (marine water)	PEC: 0.036 mg/kg ww; RCR: 0.01
Top predator's prey (marine water)	PEC: 0.019 mg/kg ww; RCR: 0.01
Predator's prey (terrestial)	PEC: 0.013 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.649E-4 mg/m³; RCR: 0.01
Man via environment – Oral	Exposure via food consumption: 0.001 mg/kg bw/day; RCR: 0.01
Man via environment - combined routes	RCR: 0.01

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative exposure [mg/m³]. EE(derm): Estimated dermal exposure [mg/kg b.w./d].

Proc 1	EE(inhal): 0.054; EE(derm): 0.007
Proc 2	EE(inhal): 5.426; EE(derm): 0.274
Proc 3	EE(inhal): 11,39; EE(derm): 0.138 - Contributing Scenarios 4
	EE(inhal): 1.628; EE(derm): 0.138 - Contributing Scenarios 5
	EE(inhal): 1.628; EE(derm): 0.138 - Contributing Scenarios 6
Proc 4	EE(inhal): 8.139; EE(derm): 1.372 - Contributing Scenarios 7
	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 8
	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 9
Proc 8a	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 10
	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 11
Proc 8b	EE(inhal): 8.139; EE(derm): 2.742 - Contributing Scenarios 12
	EE(inhal): 2.713; EE(derm): 2.742 - Contributing Scenarios 13
	EE(inhal): 1.357; EE(derm): 2.742 - Contributing Scenarios 14
Proc 9	EE(inhal): 8.139; EE(derm): 1.372 - Contributing Scenarios 15
	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 16
	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 17
Proc 15	EE(inhal): 8.139; EE(derm): 0.068 - Contributing Scenarios 18
	EE(inhal): 2.713; EE(derm): 0.068 - Contributing Scenarios 19

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): 0.01; RCR(derm): 0.01
Proc 2	RCR(inhal): 0.424; RCR(derm): 0.012
Proc 3	RCR(inhal): 0.89; RCR(derm): 0.01 - Contributing Scenarios 4
	RCR(inhal): 0.127; RCR(derm): 0.01 - Contributing Scenarios 5
	RCR(inhal): 0.127; RCR(derm): 0.01 - Contributing Scenarios 6
Proc 4	RCR(inhal): 0.636; RCR(derm): 0.06 - Contributing Scenarios 7

	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 8
	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 9
Proc 8a	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 10
	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 11
Proc 8b	RCR(inhal): 0.636; RCR(derm): 0.119 - Contributing Scenarios 12
	RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 13
	RCR(inhal): 0.106; RCR(derm): 0.119 - Contributing Scenarios 14
Proc 9	RCR(inhal): 0.636; RCR(derm): 0.06 - Contributing Scenarios 15
	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 16
	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 17
Proc 15	RCR(inhal): 0.636; RCR(derm): 0.01 - Contributing Scenarios 18
	RCR(inhal): 0.212; RCR(derm): 0.01 - Contributing Scenarios 19

Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES
Usage of relase factors allows downstream users to verify in a first approximation, if the combination of local usage and production conditions meets the defined release quantities resulting from this exposure scenario (calculated as M(site) [see amounts used, contributing scenario 1] x release factor [Technical conditions and measures at process level (source) to prevent release; contributing scenario 1])

associated uses:
Should consumer uses be associated with this exposure scenario, please contact OQ for further details
Other combinations of operational conditions may also be safe. Please contact OQ in case your local operational conditions differ from the ones described above and you are unsure if they are also safe