

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended



2-Ethylhexanol
10050

Version / Revision
Supersedes Version

5.01
5.00***

Revision Date
Issuing date

25-Jan-2023
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
Registration number (REACH) 01-2119487289-20

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

National emergency telephone number National Poisons Information Centre
+353 (0)1 809 2166
available to the public 8 am - 10 pm
+353 (0)1 809 2566
available 24/7 for medical professionals

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

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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	REACH-No	1272/2008/EC	Concentration (%)
2-Ethylhexan-1-ol	104-76-7	01-2119487289-20	Acute Tox. 4; H332 Skin Irrit. 2; H315 Eye Irrit. 2; H319 STOT SE 3; H335 ATE = 1,1 mg/L (inhalation)	> 99,5

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			(dust/mist)	
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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

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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.

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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/m ³)	TWA (ppm)	STEL (mg/m ³)	STEL (ppm)	Skin Absorption
2-Ethylhexan-1-ol CAS: 104-76-7	5.4	1			

Exposure limits Ireland

Ireland OELs

Component	TWA (mg/m ³)	TWA (ppm)	STEL (mg/m ³)	STEL (ppm)	Skin Absorption	Sensitizer
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2-Ethylhexan-1-ol CAS: 104-76-7	5.4	1				
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Notes

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/m ³
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/m ³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	53,2 mg/m ³
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/m ³
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/m ³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	26,6 mg/m ³
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

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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

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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 mm ² /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	C ₈ H ₁₈ O
log K _{oc}	2,12 calculated
Dissociation constant	pK _a 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

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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

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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

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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/m ³	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>.

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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: $1,13 \times 10^{-11}$ 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)

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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)

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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

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)

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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

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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)

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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, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, 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)

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

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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

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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

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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

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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

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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 (terrestrial)	PEC: 0.014 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 0.001 mg/m ³ ; 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

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Proc 9	EE(inhal): 1.357; EE(derm): 2.742 - Contributing Scenarios 14 EE(inhal): 8.139; EE(derm): 1.372 - Contributing Scenarios 15 EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 16
Proc 15	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 17 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

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Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m^3]; EE(derm): Estimated dermal long-term exposure [$\text{mg}/\text{kg b.w.}/\text{d}$]. 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]

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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

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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

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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

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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

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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

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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

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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 (terrestrial)	PEC: 0.027 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 0.05 mg/m ³ ; 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.

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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): 0.0382; 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

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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).

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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

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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

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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

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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 (terrestrial)	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

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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:

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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.

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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

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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 (terrestrial)	PEC: 0.013 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.764E-4 mg/m ³ ; 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

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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:

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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 %).

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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 cm²)

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

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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 (terrestrial)	PEC: 0.012 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.645E-4 mg/m ³ ; 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

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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
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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).

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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

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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

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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 (terrestrial)	PEC: 0.001 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.542E-4 mg/m ³ ; 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

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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
Proc 15	RCR(inhal): 0.106; RCR(derm): 0.119 - Contributing Scenarios 10 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

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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

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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

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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

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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)	PEC: 0.015 mg/kg ww; RCR: 0.01

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water)
Predator's prey (terrestrial) 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 RCR: 0.01
routes

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)

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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 (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

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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

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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	PEC: 0.008 mg/l; RCR: 0.01

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(Effluent)

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 (terrestrial)	PEC: 0.002 mg/kg ww; RCR: 0.01
Man via environment – Inhalation	Concentration in air: 5.546E-4 mg/m ³ ; 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)

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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 (including 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

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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

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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)

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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

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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

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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 (terrestrial)	PEC: 0.013 mg/kg ww; RCR: 0.01

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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
Proc 8b	EE(inhal): 5.426; EE(derm): 2.742 - Contributing Scenarios 11 EE(inhal): 8.139; EE(derm): 2.742 - Contributing Scenarios 12 EE(inhal): 2.713; EE(derm): 2.742 - Contributing Scenarios 13
Proc 9	EE(inhal): 1.357; EE(derm): 2.742 - Contributing Scenarios 14 EE(inhal): 8.139; EE(derm): 1.372 - Contributing Scenarios 15 EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 16
Proc 15	EE(inhal): 2.713; EE(derm): 1.372 - Contributing Scenarios 17 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
Proc 8b	RCR(inhal): 0.424; RCR(derm): 0.119 - Contributing Scenarios 11 RCR(inhal): 0.636; RCR(derm): 0.119 - Contributing Scenarios 12 RCR(inhal): 0.212; RCR(derm): 0.119 - Contributing Scenarios 13
Proc 9	RCR(inhal): 0.106; RCR(derm): 0.119 - Contributing Scenarios 14 RCR(inhal): 0.636; RCR(derm): 0.06 - Contributing Scenarios 15 RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 16
Proc 15	RCR(inhal): 0.212; RCR(derm): 0.06 - Contributing Scenarios 17 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 release 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

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(calculated as $M(\text{site})$ [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