SAFETY DATA SHEET

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

Isobutanol
10250

Version / Revision	6	**Revision Date**	26-Oct-2022
Supersedes Version	5.00***	**Issuing date**	26-Oct-2022

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

1.1. Product identifier

Identification of the substance/preparation **Isobutanol**

Chemical Name 2-Methylpropan-1-ol
CAS-No 78-83-1
EC No. 201-148-0

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

Identified uses
Intermediate
Formulation
Distribution of substance
coatings
cleaning agent
Lubricants and lubricant additives
Metal working fluids / rolling oils
laboratory chemicals
Polymer processing
consumer care product

Uses advised against None

1.3. Details of the supplier of the safety data sheet

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

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

1.4. Emergency telephone number

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flammable liquid Category 3, H226
Skin corrosion/irritation Category 2, H315
Serious eye damage/eye irritation Category 1, H318
Target Organ Systemic Toxicant - Single exposure Category 3, H335, Category 3, H336

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	**Danger**
Hazard statements	H226: Flammable liquid and vapour. H315: Causes skin irritation. H318: Causes serious eye damage. H335: May cause respiratory irritation. H336: May cause drowsiness or dizziness.
Precautionary statements	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P261: Avoid breathing gas/mist/vapours. P280: Wear protective gloves/protective clothing/eye protection/face protection. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310: Immediately call a POISON CENTER/doctor. P403 + P235: Store in a well ventilated place. Keep cool.

2.3. Other hazards

Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback
Vapours may form explosive mixture with air
Components of the product may be absorbed into the body by inhalation, ingestion and through the skin

PBT and vPvB assessment	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)
Endocrine disrupting assessments	The substance is not listed on the candidate list according to Art. 59(1), REACh. The substance was not assessed as having endocrine disrupting properties according to regulation 2017/2100/EU or 2018/605/EU.

SECTION 3: Composition / information on ingredients

3.1. Substances

Component	CAS-No	1272/2008/EC	Concentration (%)
2-Methylpropan-1-ol	78-83-1	Flam. Liq. 3; H226 Skin Irrit. 2; H315 Eye Dam. 1; H318 STOT SE 3; H335 STOT SE 3; H336	> 99,0

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
Rinse mouth. Call a physician immediately. If conscious, drink plenty of water. Do not induce vomiting without medical advice.

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

Main symptoms
headache, dizziness, drowsiness, abdominal pain, nausea, diarrhea, vomiting, unconsciousness.

Special hazard
Lung irritation, Pneumonia.

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

General advice
Remove contaminated, soaked clothing immediately and dispose of safely. If unconscious place in recovery position and seek medical advice. First aider needs to protect himself.

Treat symptomatically. If ingested, irrigate the stomach using activated charcoal. Chemical pneumonitis could follow respiratory exposure.

SECTION 5: Firefighting measures

5.1. Extinguishing media

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

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
Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback
Vapours may form explosive mixture with air

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. Do not allow run-off from fire fighting to enter drains or water courses. Foam should be applied in large quantities as it is broken down to some extent by the product.

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 (e.g. universal binder). 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.

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 is heavier than air and can travel considerable distance to a source of ignition and flashback. Vapours may form explosive mixture with air.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care.

Suitable material
stainless steel, mild steel

Unsuitable material
Aluminium, Attacks some forms of plastic and rubber

Temperature class
T2

7.3. Specific end use(s)

Intermediate
Formulation
Distribution of substance
coatings
cleaning agent
Lubricants and lubricant additives
Metal working fluids / rolling oils
laboratory chemicals
Polymer processing
consumer care product
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

No exposure limits established

Exposure limits UK

EH40 WELs

Component	TWA (mg/m³)	TWA (ppm)	STEL (mg/m³)	STEL (ppm)
2-Methylpropan-1-ol CAS: 78-83-1	154	50	231	75

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

DNEL & PNEC

2-Methylpropan-1-ol, CAS: 78-83-1
Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	310 mg/m³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	No hazard identified
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	Low hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	55 mg/m³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	No hazard identified
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	No hazard identified
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	0,4 mg/l

PNEC aqua - marine water	0,04 mg/l
PNEC aqua - intermittent releases	11 mg/l
PNEC STP	10 mg/l
PNEC sediment - freshwater	1,56 mg/kg dw
PNEC sediment - marine water	0,156 mg/kg dw
PNEC Air	No hazard identified
PNEC soil	0,0756 mg/kg dw
Secondary poisoning	No potential for bioaccumulation

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	butyl-rubber
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,3 mm
Break through time	> 480 min

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

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

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

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

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	liquid***
Colour	colourless
Odour	alcoholic
Odour threshold	123 mg/m³
Melting point/freezing point	< -90 °C (Pour point) < - 20 °C (Freezing Point)
Method	DIN ISO 3016
Boiling point or initial boiling point and boiling range	108 °C @ 1013 hPa
Method	OECD 103
Flammability	Ignitable
Lower explosion limit	1,2 Vol %
Upper explosion limit	10,9 Vol %
Flash point	31 °C @ 1013 hPa
Method	ISO 2719
Autoignition temperature	400 °C @ 1007 hPa
Method	DIN 51794
Decomposition temperature	No data available
pH	neutral
Kinematic Viscosity	5,039 mm²/s @ 20 °C***
Method	DIN 51562, ASTM D445***
Solubility	70 g/l @ 20 °C, in water, OECD 105
Partition coefficient n-octanol/water (log value)	1 @ pH 7 @ 25°C (77°F) (measured) OECD 117

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
10,5	1,05	0,010	20	68	OECD 104
40	4	0,039	41	105,8	OECD 104

Density and/or relative density

Values	@ °C	@ °F	Method
0,802	20	68	DIN 51757

Relative vapour density	2,6 (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	74,12

Molecular formula	C4 H10 O
log Koc	0,47 calculated
Refractive index	1,396 @ 20 °C
Surface tension	69,7 mN/m (1 g/l @ 20°C (68°F)), OECD 115
Evaporation rate	No data available

SECTION 10: Stability and Reactivity

10.1. Reactivity

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

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Vapours may form explosive mixture with air.

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-Methylpropan-1-ol (78-83-1)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	> 2830 mg/kg	rat, male	OECD 401
Oral	LD50	3350 mg/kg	rat, female	OECD 401
Dermal	LD50	> 2000 mg/kg	rabbit male female	OECD 402
Inhalative	LC50	> 18,18 mg/l (6 h)	rat, male/female	40 CFR 798.1150

2-Methylpropan-1-ol, CAS: 78-83-1
Assessment
Based on available data, the classification criteria are not met for:
Acute oral toxicity
Acute dermal toxicity
Acute inhalation toxicity

Irritation and corrosion				
2-Methylpropan-1-ol (78-83-1)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	Mild skin irritation	OECD 404	Weight of evidence in vivo 4h
Eyes	rabbit	corrosive	OECD 405	in vivo 24h
Respiratory tract	mouse male	RD50: 1818 ppm		5 min

2-Methylpropan-1-ol, CAS: 78-83-1
Assessment
The available data lead to the classification given in section 2

Sensitization				
2-Methylpropan-1-ol (78-83-1)				
Target Organ Effects	Species	Evaluation	Method	
Skin		not sensitizing	QSAR	Weight of evidence

2-Methylpropan-1-ol, CAS: 78-83-1
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-Methylpropan-1-ol (78-83-1)				
Type	Dose	Species	Method	
Subchronic toxicity	NOEL: > 1450 mg/m³/d (90 d)	rat, male/female	OECD 408	Oral
Subchronic toxicity	NOAEL: >=7,5 mg/l	rat rat, male/female	EPA OPPTS 870.3800	Inhalation
Subchronic toxicity	NOEL: ~ 3 mg/m³/d (102 d)	rat, male/female	82-7 F	Inhalation

2-Methylpropan-1-ol, CAS: 78-83-1
Assessment
Based on available data, the classification criteria are not met for:
STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity					
2-Methylpropan-1-ol (78-83-1)					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	OECD 471 (Ames)	In vitro study
Mutagenicity		V79 cells, Chinese hamster	negative	HPRT	In vitro study
Mutagenicity		V79 cells, Chinese hamster	negative	Chromosomal Aberration	in vitro micronucleus study
Mutagenicity		mouse male/female	negative	OECD 474	Oral in vivo
Carcinogenicity			negative	QSAR	
Reproductive toxicity	NOAEL >= 7,5 mg/l	rat, parental		EPA OPPTS 870.3800	Inhalation
Reproductive toxicity	NOAEL >= 7,5	rat, 1.		EPA OPPTS	Inhalation

	mg/l	Generation, male/female rat 2. Generation, male/female		870.3800	
Developmental Toxicity	NOAEL 10 mg/l	rat		OECD 414, Inhalative	Maternal toxicity
Developmental Toxicity	NOAEL 2,5 mg/l	rabbit		OECD 414, Inhalative	Maternal toxicity
Developmental Toxicity	NOAEL > 10 mg/l	rabbit rat		OECD 414, Inhalative	Teratogenicity
Developmental Toxicity	NOAEL > 10 mg/l	rabbit rat		OECD 414, Inhalative	Fetal toxicity
Mutagenicity		human lung carcinoma epithelial A549	negative	Comet Assay	In vitro study

2-Methylpropan-1-ol, CAS: 78-83-1
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
In vitro tests did not show mutagenic effects
Did not show reprotoxic or mutagenic effects in animal experiments
No developmental effects in the absence of maternal toxicity
No indication for a carcinogenic potential

2-Methylpropan-1-ol, CAS: 78-83-1
Main symptoms
headache, dizziness, drowsiness, abdominal pain, nausea, diarrhoea, vomiting, unconsciousness.
Target Organ Systemic Toxicant - Single exposure
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
Based on the viscosity a potential aspiration hazard cannot be excluded

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-Methylpropan-1-ol, CAS: 78-83-1
Other adverse effects
Components of the product may be absorbed into the body by inhalation, ingestion and through the skin.
Note
Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link:
http://echa.europa.eu/information-on-chemicals/registered-substances.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity

2-Methylpropan-1-ol (78-83-1)			
Species	Exposure time	Dose	Method
Pimephales promelas (fathead minnow)	96h	LC50: 1430 mg/l	
Daphnia pulex (Water flea)	48h	EC50: 1100 mg/l	ASTM D4229
Pseudokirchneriella subcapitata	72h	EC50: 1799 mg/l (Growth rate)	OECD 201
Pseudokirchneriella subcapitata	72h	EC50: 632 mg/l (Biomass)	OECD 201
Bacteria / Sewage	16 h	IC50: > 1000 mg/l (Growth inhibition)	
Pseudomonas putida	TGK: 280 mg/l	Cell multiplication inhibition test	

Long term toxicity				
2-Methylpropan-1-ol (78-83-1)				
Type	Species	Dose	Method	
Reproductive toxicity	Daphnia magna (Water flea)	NOEC: 20 mg/l (21d)		
Aquatic toxicity	Pseudokirchneriella subcapitata	NOEC: 53 mg/l (3d) Biomass	OECD 201	

12.2. Persistence and degradability

2-Methylpropan-1-ol, CAS: 78-83-1
Biodegradation
70-80 % (28 d), Industrial sewage filtrate, aerobic, OECD 301 D.

Abiotic Degradation		
2-Methylpropan-1-ol (78-83-1)		
Type	Result	Method
Hydrolysis	No data available	
Photolysis	Half-life (DT50): 56 h	calculated SRC AOP v1.92

12.3. Bioaccumulative potential

2-Methylpropan-1-ol (78-83-1)		
Type	Result	Method
log Pow	1 @ pH 7 @ 25°C (77°F)	measured, OECD 117
BCF	not expected	

12.4. Mobility in soil

2-Methylpropan-1-ol (78-83-1)		
Type	Result	Method
Surface tension	69,7 mN/m (1 g/l @ 20°C (68°F))	OECD 115
Adsorption/Desorption	log Koc: 0,47	calculated SRC PCKOCWIN v2.00
Distribution to environmental compartments	no data available	

12.5. Results of PBT and vPvB assessment

2-Methylpropan-1-ol, CAS: 78-83-1
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-Methylpropan-1-ol, CAS: 78-83-1
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

ADR/RID

14.1. UN number or ID number	UN 1212
14.2. UN proper shipping name	Isobutanol
14.3. Transport hazard class(es)	3
14.4. Packing group	III
14.5. Environmental hazards	no
14.6. Special precautions for user	
ADR Tunnel restriction code	(D/E)
Classification Code	F1
Hazard Number	30

ADN ADN: Container and Tanker

14.1. UN number or ID number	UN 1212
14.2. UN proper shipping name	Isobutanol
14.3. Transport hazard class(es)	3
14.4. Packing group	III
14.5. Environmental hazards	no

14.6. Special precautions for user

Classification Code	F1
Hazard Number	30

ICAO-TI / IATA-DGR

14.1. UN number or ID number	UN 1212
14.2. UN proper shipping name	Isobutanol
14.3. Transport hazard class(es)	3
14.4. Packing group	III
14.5. Environmental hazards	no
14.6. Special precautions for user	no data available

IMDG

14.1. UN number or ID number	UN 1212
14.2. UN proper shipping name	Isobutanol
14.3. Transport hazard class(es)	3
14.4. Packing group	III
14.5. Environmental hazards	no
14.6. Special precautions for user	
EmS	F-E, S-D
14.7. Maritime transport in bulk according to IMO instruments	***
Product name	Isobutyl alcohol
Ship type	3
Pollution category	Z
Hazard class	S/P***

SECTION 15: Regulatory information

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

Regulation 1272/2008, Annex VI

2-Methylpropan-1-ol, CAS: 78-83-1

Classification	Flam. Liq. 3; H226 STOT SE 3; H335 Skin Irrit. 2; H315 Eye Dam. 1; H318 STOT SE 3; H336
Hazard pictograms	GHS02 Flame GHS05 Corrosion GHS07 Exclamation mark
Signal word	Danger
Hazard statements	H226, H335, H315, H318, H336

DI 2012/18/EU (Seveso III)

Category	Annex I, part 1: P5a - c; depending on conditions

DI 1999/13/EC (VOC Guideline)

Component	Status
2-Methylpropan-1-ol CAS: 78-83-1	regulated

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

Component	Status
2-Methylpropan-1-ol CAS: 78-83-1	The substance is/will be pre-registered

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

International Inventories

2-Methylpropan-1-ol, CAS: 78-83-1
AICS (AU)
DSL (CA)
IECSC (CN)
EC-No. 2011480 (EU)
ENCS (2)-3049 (JP)
ISHL (2)-3049 (JP)
KECI KE-24894 (KR)
INSQ (MX)
PICCS (PH)
TSCA (US)
NZIoC (NZ)
TCSI (TW)

National regulatory information Great Britain

Releases to air (Pollution Inventory Substances)
not subject

Releases to water (Pollution Inventory Substances)
not subject

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

15.2. Chemical safety assessment

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

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3
H226: Flammable liquid and vapour.
H315: Causes skin irritation.
H318: Causes serious eye damage.

H335: May cause respiratory irritation.
H336: May cause drowsiness or dizziness.

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

Human health hazard assessment:
A quantitative approach used to conclude safe use for:
Long term local hazards via inhalation
A qualitative approach used to conclude safe use for:
Long-term Systemic effects via inhalation
Acute systemic hazards via inhalation
Acute local hazards via inhalation
Long-term Systemic effects via skin
Acute local hazards via skin
Long-term local effects via skin
Acute systemic hazards via skin
Local hazards via eyes

For consumer applications in the following usage areas please contact OQ (sc.psq@oq.com):
Uses in coatings
Use in Cleaning Agents
Lubricants
Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human

health is covered by alternative legislation

For specific information regarding the SPERC used please refer to the ESIG webpage https://www.esig.org/reach-ges/environment/

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

Operational conditions and risk management measures
Following operational conditions and risk management measures, are based on qualitative risk characterisation:
Wear protective gloves and eye/face protection
Minimization of manual phases
Avoid direct contact with the chemical/the product/the preparation by establishing organisational measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Exposure scenario identification

1 Industrial use resulting in manufacture of another substance (use of intermediates)
2 Formulation & (re)packing of substances and mixtures
3 Distribution of substance
4 Uses in coatings
5 Uses in coatings
6 Use in Cleaning Products
7 Use in Cleaning Products
8 Lubricants
9 Lubricants
10 Metal working fluids / rolling oils
11 Metal working fluids / rolling oils
12 Use in laboratories
13 Polymer processing

Number of the ES 1

Short title of the exposure scenario

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

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
SU9: Manufacture of fine chemicals

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)

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
Manufacture of the substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container).

Further explanations
Assessment tool used:
Chesar 3.2
Industrial use
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System
Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Contributing Scenarios

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

Product characteristics
liquid.
Amounts used
Daily amount per site: 61 to
Annual amount per site: 20124 to
Fraction of EU tonnage used in region: 1
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.05 %
Release fraction to wastewater from process: 0.02 %
Release fraction to soil from process: 0.1%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 99 % Onsite treatment off-air. Upgrade Systems in place or implement addional treatment. Assumed Efficiency: 99 %
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
Water flow in sewage/river (m^3/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49
Do not apply industrial sludge to natural soils

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 4

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
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 basic standard of general ventilation (1 to 3 air changes per hour).

Number of the contributing scenario **6**
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).

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

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

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).

Number of the contributing scenario 8
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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 0.079 mg/l; RCR: 0.197
Fresh Water (Sediment)	PEC: 0.306 mg/kg dw; RCR: 0.197
Marine Water (Pelagic)	PEC: 7.87E-3 mg/l; RCR: 0.197
Marine Water (Sediment)	PEC: 0.031 mg/kg dw; RCR: 0.196
Agricultural Soil	PEC: 8.88E-4 mg/kg dw; RCR: 0.012
Sewage Treatment Plant (Effluent)	PEC: 0.763 mg/l; RCR: 0.076

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05

Number of the ES 2

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)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15: Use as laboratory reagent

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

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenanance and associated laboratory activities.

Further explanations
Assessment tool used:
Chesar 3.2
Covers percentage substance in the product up to 100 % (unless stated differently).
Industrial 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

Contributing Scenarios

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

Amounts used
Daily amount per site: 36.4 to
Annual amount per site: 10915 to
Fraction of EU tonnage used in region: 1
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 2.5%
Release fraction to wastewater from process: 0.02%
Release fraction to soil from process: 0.01%
Release factor to external waste : 0 %
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 99 % Onsite treatment off-air. Upgrade Systems in place or implement addional treatment. Assumed Efficiency: 70 %
Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/ treatment plant (m³/d): 2000
Water flow in sewage/river (m³/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49
Do not apply industrial sludge to natural soils

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 4

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).

Number of the contributing scenario **6**
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).

Number of the contributing scenario **7**
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).

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

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

Number of the contributing scenario **9**
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).

Number of the contributing scenario **10**
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 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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 0.048 mg/l; RCR: 0.12
Fresh Water (Sediment)	PEC: 0.176 mg/kg dw; RCR: 0.12
Marine Water (Pelagic)	PEC: 4.8E-3 mg/l; RCR: 0.12
Marine Water (Sediment)	PEC: 0.019 mg/kg dw; RCR: 0.12
Agricultural Soil	PEC: 8.67E-3 mg/kg dw; RCR: 0.113
Sewage Treatment Plant (Effluent)	PEC: 0.455 mg/l; RCR: 0.046

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 5	EE(inhal): 15.44
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 15	EE(inhal): 30.88

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 5	RCR(inhal): 0.05
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 15	RCR(inhal): 0.1

Number of the ES 3

Short title of the exposure scenario
Distribution of substance

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
SU9: Manufacture of fine chemicals

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]
ERC2: Formulation of preparations (mixtures)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities.

Further explanations
Assessment tool used:
Chesar 3.2
Industrial use
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)***

Contributing Scenarios

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

Further specification
SpERC ESVOC 1.1b.v1 (ESVOC 3).
Amounts used
Daily amount per site: 0.028 to
Annual amount per site: 42577 to
Fraction of Regional tonnage used locally: 0.2
Release factor to external waste : 0 %
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: 0.001%
Release fraction to soil from process: 0.001%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption.
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
Water flow in sewage/river (m^3/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49

Number of the contributing scenario **2**

Contributing exposure scenario controlling worker exposure for PROC 1

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 4

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).

Number of the contributing scenario **6**
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).

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

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

Number of the contributing scenario **8**
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).

Number of the contributing scenario **9**
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 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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 2.5E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.72E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.57E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 3.44E-3 mg/kg dw; RCR: 0.045
Sewage Treatment Plant (Effluent)	PEC: 1.77E-5 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 15	EE(inhal): 30.88

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 15	RCR(inhal): 0.1

Number of the ES 4

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)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC7: Industrial spraying
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10: Roller application or brushing
PROC13: Treatment of articles by dipping and pouring
PROC15: Use as laboratory reagent

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

Product characteristics

Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning

Further explanations
Industrial use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 7
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
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification
release factors for (Sp)ERC were modified.
Amounts used
Daily amount per site: 10.39 to
Annual amount per site: 3116 to
Fraction of EU tonnage used in region: 1
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 3.6%
Release fraction to wastewater from process: 0%
Release fraction to soil from process: 0%
Release factor to external waste : 0 %
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption.
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
Water flow in sewage/river (m^3/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 4

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).

Number of the contributing scenario **6**
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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use

Room volume > 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario **8**
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).

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

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

Number of the contributing scenario **10**
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).

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

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).

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

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).

Number of the contributing scenario **13**
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 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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 2.49E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 8.9E-3 mg/kg dw; RCR: 0.116
Sewage Treatment Plant (Effluent)	PEC: 0 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 5	EE(inhal): 15.44
Proc 7	EE(inhal): 0
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44

Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44
Proc 15	EE(inhal): 30.88

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 5	RCR(inhal): 0.05
Proc 7	RCR(inhal): < 0.01
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05
Proc 15	RCR(inhal): 0.1

Number of the ES 5

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)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10: Roller application or brushing
PROC11: Non industrial spraying
PROC13: Treatment of articles by dipping and pouring
PROC15: Use as laboratory reagent
PROC19: Hand-mixing with intimate contact and only PPE available

Environmental release categories [ERC]
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) 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
Professional use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 11
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification
SpERC ESVOC 8.3b.v1.
Amounts used
daily wide dispersive use: 0.0002 to/d
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used locally: 0.0005
Frequency and duration of use
Covers use up to: 365 days
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%
Release factor to external waste : 0 %
Conditions and measures related to municipal sewage treatment plant
The minimum grade of elimination in the sewage plant is (%): 87.4

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 4

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).

Number of the contributing scenario **6**
Contributing exposure scenario controlling worker exposure for PROC 5

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Room volume > 1000 m3
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for PROC 11

Further specification

Assessment tool used: StoffenManager
Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario 13
Contributing exposure scenario controlling worker exposure for PROC 11

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Room volume < 100 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h. Inspect and clean equipment regularly.

Number of the contributing scenario 14
Contributing exposure scenario controlling worker exposure for PROC 13

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

Number of the contributing scenario 15
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 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).

Number of the contributing scenario **16**
Contributing exposure scenario controlling worker exposure for PROC 19

Product characteristics
Liquid
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 1980 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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 2.51E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.76E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.47E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.62E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.76E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 1.35E-4 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 4	EE(inhal): 154.4
Proc 5	EE(inhal): 185.3
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 9	EE(inhal): 185.3
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 11 EE(inhal): 256.10 - Contributing Scenario 12 EE(inhal): 240.60 - Contributing Scenario 13
Proc 13	EE(inhal): 185.3
Proc 15	EE(inhal): 30.88
Proc 19	EE(inhal): 185.3

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01

Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.2490
Proc 4	RCR(inhal): 0.4980
Proc 5	RCR(inhal): 0.598
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 9	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 11
	RCR(inhal): 0.826 - Contributing Scenarios 12
	RCR(inhal): 0.776 - Contributing Scenarios 13
Proc 13	RCR(inhal): 0.598
Proc 15	RCR(inhal): 0.1
Proc 19	RCR(inhal): 0.598

Number of the ES 6

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]
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
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

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 transfer from storage, pouring/unloading from drums or containers. exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.

Further explanations
Industrial use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 7
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

Covers percentage substance in the product up to 100 % (unless stated differently).***

Contributing Scenarios

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

Further specification
SpERC ESVOC 4.4a.v1 (ESVOC 8).
Amounts used
Daily amount per site: 5 to
Annual amount per site: 100 to
Fraction of Regional tonnage used locally: 1
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 30%
Release fraction to wastewater from process: 0.01%
Release fraction to soil from process: 0%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption.
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.47

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 4

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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Room volume > 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario **7**
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).

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

Product characteristics

Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).

Number of the contributing scenario **9**
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).

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

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).

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for PROC 13

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: 5.62E-3 mg/l; RCR: 0.014
Fresh Water (Sediment)	PEC: 0.022 mg/kg dw; RCR: 0.014
Marine Water (Pelagic)	PEC: 5.58E-4 mg/l; RCR: 0.014

Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 8.11E-3 mg/kg dw; RCR: 0.106
Sewage Treatment Plant (Effluent)	PEC: 0.031 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 7	EE(inhal): 0
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 7	RCR(inhal): < 0.01
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05

Number of the ES 7

Short title of the exposure scenario

Use in Cleaning Products

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)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10: Roller application or brushing
PROC11: Non industrial spraying
PROC13: Treatment of articles by dipping and pouring

Environmental release categories [ERC]
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 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
Professional use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 11
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification
SpERC ESVOC 8.4b.v1 (ESVOC 9).
Amounts used
daily wide dispersive use: 0.000042 to/d
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used locally: 0.0005
Frequency and duration of use
Covers use up to: 365 days
Environment factors not influenced by risk management
River flow rate: 18000 m³/d Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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: 2%
Release fraction to wastewater from process: 0.0001%
Release fraction to soil from process: 0%
Release factor to external waste : 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 (%): 87.47

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 4

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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume > 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for PROC 11

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume < 100 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide enhanced general ventilation by mechanical means. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h. Inspect and clean equipment regularly.

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 2.49E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.69E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 2.64E-9 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 4	EE(inhal): 154.4
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 9	EE(inhal): 185.3
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 10
	EE(inhal): 256.10 - Contributing Scenario 11
	EE(inhal): 240.60 - Contributing Scenario 12
Proc 13	EE(inhal): 185.3

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.2490
Proc 4	RCR(inhal): 0.4980
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 9	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 10
	RCR(inhal): 0.826 - Contributing Scenarios 11
	RCR(inhal): 0.776 - Contributing Scenarios 12
Proc 13	RCR(inhal): 0.598

Number of the ES 8

Short title of the exposure scenario
Lubricants

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
PROC7: Industrial spraying
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10: Roller application or brushing
PROC13: Treatment of articles by dipping and pouring
PROC17: Lubrication at high energy conditions and in partly open process
PROC18: Greasing at high energy conditions

Environmental release categories [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 of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.

Further explanations
Industrial use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 7
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification
release factors for (Sp)ERC were modified, SpERC ESVOC 4.6a.v1 (ESVOC 13).
Amounts used
Daily amount per site: 46.75 to
Annual amount per site: 935 to
Fraction of EU tonnage used in region: 1
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.3%
Release fraction to wastewater from process: 0.015%
Release fraction to soil from process: 0.1%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Onsite treatment off-air; Apply air filtration - particle removal. Assumed Efficiency: 70 % Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 85 %
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
Water flow in sewage/river (m^3/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49

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

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

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).

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 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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 4

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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume > 1000 m3
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario 7
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).

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

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

Number of the contributing scenario 9
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).

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

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).

Number of the contributing scenario **11**
Contributing exposure scenario controlling worker exposure for PROC 13

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).

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for PROC 17

Further specification
Assessment tool used: Chesar 2.3
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).

Number of the contributing scenario **13**
Contributing exposure scenario controlling worker exposure for PROC 17

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Operation is carried out at elevated temperature (> 20°C above ambient temperature)
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).

Number of the contributing scenario **14**
Contributing exposure scenario controlling worker exposure for PROC 18

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).

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

Frequency and duration of use
8 h (full shift)
Human factors not influenced by risk management
corresponds to 2 hands (960 cm²)
Other given operational conditions affecting workers exposure
Indoor use
Operation is carried out at elevated temperature (> 20°C above ambient temperature)
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: 0.046 mg/l; RCR: 0.116
Fresh Water (Sediment)	PEC: 0.18 mg/kg dw; RCR: 0.116
Marine Water (Pelagic)	PEC: 4.63E-3 mg/l; RCR: 0.116
Marine Water (Sediment)	PEC: 0.018 mg/kg dw; RCR: 0.116
Agricultural Soil	PEC: 2.51E-3 mg/kg dw; RCR: 0.033
Sewage Treatment Plant (Effluent)	PEC: 0.439 mg/l; RCR: 0.044

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 7	EE(inhal): 0
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44
Proc 17	EE(inhal): 154.4 - Contributing Scenario 12 EE(inhal): 30.88 - Contributing Scenario 13
Proc 18	EE(inhal): 154.4 - Contributing Scenario 14 EE(inhal): 30.88 - Contributing Scenario 15

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio. 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
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199

Proc 7	RCR(inhal): 0.0000
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05
Proc 17	RCR(inhal): 0.4980 - Contributing Scenarios 12 RCR(inhal): 0.1 - Contributing Scenarios 13
Proc 18	RCR(inhal): 0.4980 - Contributing Scenarios 14 RCR(inhal): 0.1 - Contributing Scenarios 15

Number of the ES 9

Short title of the exposure scenario

Lubricants

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)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10: Roller application or brushing
PROC11: Non industrial spraying
PROC13: Treatment of articles by dipping and pouring
PROC17: Lubrication at high energy conditions and in partly open process
PROC18: Greasing at high energy conditions
PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

Environmental release categories [ERC]
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
Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil.

Further explanations
Professional use
Assessment tool used:
Chesar 3.2
StoffenManager V .? for Following PROC:
PROC 11
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 9b

Further specification
SpERC ESVOC 9.6b.v1 (ESVOC 14).
Amounts used
daily wide dispersive use: 0.000023 to/d
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used locally: 0.0005
Frequency and duration of use
Covers use up to: 365 days
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: 1%
Release fraction to wastewater from process: 1%
Release fraction to soil from process: 1%
Release factor to external waste : 0 %
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment (%): 87.49

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

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

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).

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

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).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for PROC 4

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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm^2)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume > 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario **12**
Contributing exposure scenario controlling worker exposure for PROC 11

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume < 100 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide enhanced general ventilation by mechanical means. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly. Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h.

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

Further specification
Assessment tool used: Chesar 2.3
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
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).

Number of the contributing scenario **14**
Contributing exposure scenario controlling worker exposure for PROC 17

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Operation is carried out at elevated temperature (> 20°C above ambient temperature)
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
If above technical/organisational control measures are not feasible, then adopt following PPE. If carried out for more than 1h, wear respiratory protection (efficiency 90%).

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

PROC 17

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 respiratory protection (Efficiency: 90 %) Alternatively: Use duration max. 1 h.

Number of the contributing scenario **16**
Contributing exposure scenario controlling worker exposure for PROC 18

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm^2)
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). If no adequate ventilation is available, avoid carrying out operations for more than 1 h.

Number of the contributing scenario **17**
Contributing exposure scenario controlling worker exposure for PROC 18

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Indoor use
Operation is carried out at elevated temperature (> 20°C above ambient temperature)
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). If no adequate ventilation is available, respiratory protection (efficiency 90 %) must be used.
Conditions and measures related to personal protection, hygiene and health evaluation
If above technical/organisational control measures are not feasible, then adopt following PPE. If carried out for more than 1h, wear respiratory protection (efficiency 90%).

Number of the contributing scenario **18**
Contributing exposure scenario controlling worker exposure for PROC 20

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).

Exposure estimation and reference to its source

Environment

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

Fresh Water (Pelagic)	PEC: 2.5E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.57E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.7E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 1.46E-5 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 4	EE(inhal): 154.4
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 9	EE(inhal): 185.3
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 10
	EE(inhal): 256.1 - Contributing Scenario 11
	EE(inhal): 240.6 - Contributing Scenario 12
Proc 13	EE(inhal): 185.3
Proc 17	EE(inhal): 185.3 - Contributing Scenario 14
	EE(inhal): 123.5 - Contributing Scenario 15
Proc 18	EE(inhal): 123.50 - Contributing Scenario 16
	EE(inhal): 185.3 - Contributing Scenario 17
Proc 20	EE(inhal): 61.77

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.249
Proc 4	RCR(inhal): 0.498
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 9	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 10
	RCR(inhal): 0.826 - Contributing Scenarios 11
	RCR(inhal): 0.776 - Contributing Scenarios 12
Proc 13	RCR(inhal): 0.598
Proc 17	RCR(inhal): 0.598 - Contributing Scenarios 14
	RCR(inhal): 0.399 - Contributing Scenarios 15
Proc 18	RCR(inhal): 0.399 - Contributing Scenarios 16
	RCR(inhal): 0.598 - Contributing Scenarios 17
Proc 20	RCR(inhal): 0.199

Number of the ES 10

Short title of the exposure scenario
Metal working fluids / rolling oils

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
PROC17: Lubrication at high energy conditions and in partly open process

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

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Covers the use in formulated MWFs (MWFs)/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils.

Further explanations
Industrial use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 7
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
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification
SpERC ESVOC 4.7a.v1 (ESVOC 18), release factors for (Sp)ERC were modified.
Amounts used
Daily amount per site: 5 to
Annual amount per site: 100 to
Fraction of EU tonnage used in region: 1
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.6%
Release fraction to wastewater from process: 0.1%

Release fraction to soil from process: 0%
Release factor to external waste : 0 %
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Onsite treatment off-air. Upgrade Systems in place or implement addional treatment. Assumed Efficiency: 70 %
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
Water flow in sewage/river (m^3/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49

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)
Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm^2)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).

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).

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 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).

Number of the contributing scenario **5**
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).

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume > 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

Number of the contributing scenario **7**
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).

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

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

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

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

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

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).

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

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).

Number of the contributing scenario **13**
Contributing exposure scenario controlling worker exposure for PROC 17

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).

Number of the contributing scenario **14**
Contributing exposure scenario controlling worker exposure for PROC 17

Product characteristics
Liquid

Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Operation is carried out at elevated temperature (> 20°C above ambient temperature)
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: 0.034 mg/l; RCR: 0.084
Fresh Water (Sediment)	PEC: 0.131 mg/kg dw; RCR: 0.084
Marine Water (Pelagic)	PEC: 3.37E-3 mg/l; RCR: 0.084
Marine Water (Sediment)	PEC: 0.013 mg/kg dw; RCR: 0.084
Agricultural Soil	PEC: 1.71E-3 mg/kg dw; RCR: 0.022
Sewage Treatment Plant (Effluent)	PEC: 0.313 mg/l; RCR: 0.031

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 5	EE(inhal): 15.44
Proc 7	EE(inhal): < 0.01
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44
Proc 17	EE(inhal): 154.4 - Contributing Scenario 13 EE(inhal): 30.88 - Contributing Scenario 14

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): 0.0001
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 5	RCR(inhal): 0.05
Proc 7	RCR(inhal): 0
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05
Proc 17	RCR(inhal): 0.498 - Contributing Scenarios 13 RCR(inhal): 0.1 - Contributing Scenarios 14

Number of the ES 11

Short title of the exposure scenario

Metal working fluids / rolling oils

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
PROC17: Lubrication at high energy conditions and in partly open process

Environmental release categories [ERC]
ERC8a: Wide dispersive indoor 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 formulated MWFs (MWFs) including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/ reject articles, and disposal of waste oils.

Further explanations
Professional use
Assessment tool used:
Chesar 3.2
StoffenManager V 6 for Following PROC:
PROC 11
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented
Covers percentage substance in the product up to 100 % (unless stated differently).***

Contributing Scenarios

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

Further specification
SpERC ESVOC 8.7c.v1 (ESVOC 20).
Amounts used
daily wide dispersive use: 0.0027 to/d
Fraction of Regional tonnage used locally: 0.0005
Fraction of EU tonnage used in region: 0.1
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: 40%
Release fraction to wastewater from process: 5%

Release fraction to soil from process: 5%
Release factor to external waste : 0 %
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment (%): 87.49

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

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

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).

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 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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

PROC 8a

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

Number of the contributing scenario **9**
Contributing exposure scenario controlling worker exposure for
PROC 11

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume > 1000 m^3
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Technical conditions and measures to control dispersion from source towards the worker
Use in ventilated spray booths only.
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly.

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

Further specification
Assessment tool used: StoffenManager
Product characteristics
Liquid, vapour pressure 0,5 - 10 kPa at STP
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
Room volume < 100 m³
Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
Ensure that the task is not carried out by more than one worker simultaneously.
Technical conditions and measures to control dispersion from source towards the worker
Provide enhanced general ventilation by mechanical means. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).
Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day
Ensure the ventilation system is regularly maintained and tested
Conditions and measures related to personal protection, hygiene and health evaluation
Inspect and clean equipment regularly. Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h.

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

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

Number of the contributing scenario	**13**
Contributing exposure scenario controlling worker exposure for PROC 17	

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): 80 % (inhalative); 0 % (dermal). If no adequate ventilation is available, avoid carrying out operations for more than 1 h.

Number of the contributing scenario	**14**
Contributing exposure scenario controlling worker exposure for PROC 17	

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
Other given operational conditions affecting workers exposure
Operation is carried out at elevated temperature (> 20°C above ambient temperature)
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); 90 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
If above technical/organisational control measures are not feasible, then adopt following PPE. If carried out for more than 1h, 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: 3.35E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 0.013 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 3.31E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 1.29E-3 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 1.4E-4 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 8.57E-3 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative exposure [mg/m³].

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 5	EE(inhal): 185.3
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 9

	EE(inhal): 256.10 - Contributing Scenario 10
	EE(inhal): 240.60 - Contributing Scenario 11
Proc 13	EE(inhal): 185.3
Proc 17	EE(inhal): 123.50 - Contributing Scenario 13
	EE(inhal): 185.3 - Contributing Scenario 14

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
	RCR(inhal): < 0.013 - Contributing Scenarios < 0.014
Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.249
Proc 5	RCR(inhal): 0.598
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 9
	RCR(inhal): 0.826 - Contributing Scenarios 10
	RCR(inhal): 0.776 - Contributing Scenarios 11
Proc 13	RCR(inhal): 0.598
Proc 17	RCR(inhal): 0.399 - Contributing Scenarios 13
	RCR(inhal): 0.598 - Contributing Scenarios 14

Number of the ES 12

Short title of the exposure scenario
Use in laboratories

List of use descriptors

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

Process categories [PROC]
PROC10: Roller application or brushing
PROC15: Use as laboratory reagent

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

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use of small quantities within laboratory settings, including material transfers and equipment cleaning

Further explanations
Professional use
Assessment tool used:
Chesar 3.2
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification
SpERC ESVOC 8.17.v1 (ESVOC 39).
Amounts used
daily wide dispersive use: 0.0000022 to/d
Fraction of Regional tonnage used locally: 0.0005
Fraction of EU tonnage used in region: 0.1
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: 50%
Release fraction to wastewater from process: 50%
Release fraction to soil from process: 0%
Release factor to external waste : 0 %
Conditions and measures related to municipal sewage treatment plant
The minimum grade of elimination in the sewage plant is (%): 87.49

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 10

Product characteristics
Liquid
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours
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).

Number of the contributing scenario **3**
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 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).

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 2.5E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.74E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.59E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.73E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 6.85E-5 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 10	EE(inhal): 185.25
Proc 15	EE(inhal): 30.88

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 10	RCR(inhal): 0.598
Proc 15	RCR(inhal): 0.1

Number of the ES 13

Short title of the exposure scenario
Polymer processing

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)

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

Further explanations
Industrial use
Assessment tool used:
Chesar 3.2
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
Covers percentage substance in the product up to 100 % (unless stated differently)***

Contributing Scenarios

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

Further specification

SpERC ESVOC 4.21a.v1 (ESVOC 44), release factors for (Sp)ERC were modified.
Amounts used
Daily amount per site: 16.67 to
Annual amount per site: 5000 to
Fraction of EU tonnage used in region: 1
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: 10%
Release fraction to wastewater from process: 0%
Release fraction to soil from process: 0.001%
Release factor to external waste : 0 %
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Onsite treatment off-air. Upgrade Systems in place or implement addional treatment. Assumed Efficiency: 80 %
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
Water flow in sewage/river (m^3/day): 18000
The minimum grade of elimination in the sewage plant is (%): 87.49
Do not apply industrial sludge to natural soils

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

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

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).

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 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).

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

PROC 4

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).

Number of the contributing scenario **6**
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).

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

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

Number of the contributing scenario **8**
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).

Exposure estimation and reference to its source

Environment

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

Fresh Water (Pelagic)	PEC: 2.49E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 0.038 mg/kg dw; RCR: 0.542
Sewage Treatment Plant	PEC: 0 mg/l; RCR: < 0.01

(Effluent)

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³].

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05

Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES
Usage of relase factors allows downstream users to verify in a first approximation, if the combination of local usage and production conditions meets the defined release quantities resulting from this exposure scenario (calculated as M(site) [see amounts used, contributing scenario 1] x release factor [Technical conditions and measures at process level (source) to prevent release; contributing scenario 1])
For specific information regarding the SPERC used please refer to the ESIG webpage https://www.esig.org/reach-ges/environment/

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