SAFETY DATA SHEET

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

2-Ethylhexanoic acid
10040

Version / Revision	11	**Revision Date**	10-Aug-2023
Supersedes Version	10.01***	**Issuing date**	10-Aug-2023

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

1.1. Product identifier

Identification of the substance/preparation **2-Ethylhexanoic acid**

CAS-No 149-57-5
EC No. 205-743-6

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

Identified uses
Intermediate
Formulation
laboratory chemicals
Functional Fluids

Uses advised against
Consumer uses
To avoid exposure of consumers

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)

Reproductive toxicity Category 1B, H360D***

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	H360D: May damage the unborn child***
Precautionary statements	P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P280: Wear protective gloves/protective clothing/eye protection/face protection. P308 + P313: IF exposed or concerned: Get medical advice/ attention. P405: Store locked up. P501: Dispose of contents/container in accordance with local regulation.

2.3. Other hazards

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-Ethylhexanoic acid	149-57-5	Repr. 1B; H360D***	> 99,50

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

SECTION 4: First aid measures

4.1. Description of first aid measures

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

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

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

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

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

Main symptoms
None known.

Special hazard
Lung irritation, Lung oedema, Kidney disorders, respiratory disorder.

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

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

Treat symptomatically. If ingested, flush stomach and compensate acidosis.

SECTION 5: Firefighting measures

5.1. Extinguishing media

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

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

5.2. Special hazards arising from the substance or mixture

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

5.3. Advice for firefighters

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

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

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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

6.2. Environmental precautions

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

6.3. Methods and material for containment and cleaning up

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

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

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

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

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

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

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

Incompatible products
bases
amines
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.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Recommended storage temperature: =< 38 °C / =< 100 °F.

Temperature class
T2

7.3. Specific end use(s)

Intermediate
Formulation
laboratory chemicals
Functional Fluids
For specific end use information see the annex of this safety data sheet

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits European Union

Directive 2004/37/EC ***

Component	Annex I	TWA (mg/m³)	TWA (ppm)	Skin Absorption
2-Ethylhexanoic acid CAS: 149-57-5	Listed***			

Exposure limits UK

No exposure limits established.

DNEL & PNEC

2-Ethylhexanoic acid, CAS: 149-57-5
Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	14 mg/m³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	No hazard identified
DN(M)EL - long-term exposure - local effects - Inhalation	No hazard identified
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	2 mg/kg bw/day
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Dermal	No hazard identified
DN(M)EL - acute / short-term exposure - local effects - Dermal	Low hazard (no threshold derived)
DN(M)EL - local effects - eyes	Low hazard (no threshold derived)

General population

DN(M)EL - long-term exposure - systemic effects - Inhalation	3,5 mg/m³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	No hazard identified
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	1 mg/kg bw/day

DN(M)EL - acute / short-term exposure - systemic effects - Dermal	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Dermal	No hazard identified
DN(M)EL - acute / short-term exposure - local effects - Dermal	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Oral	1 mg/kg bw/day
DN(M)EL - acute / short-term exposure - systemic effects - Oral	Low hazard (no threshold derived)
DN(M)EL - local effects - eyes	Low hazard (no threshold derived)

Environment

PNEC aqua - freshwater	No hazard identified***
PNEC aqua - marine water	No hazard identified***
PNEC aqua - intermittent releases	No hazard identified***
PNEC STP	72*** mg/l
PNEC sediment - freshwater	No hazard identified***
PNEC sediment - marine water	No hazard identified***
PNEC Air	No hazard identified
PNEC soil	No hazard identified***
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	nitrile rubber
Evaluation	according to EN 374: level 6

Glove thickness	approx 0,55 mm
Break through time	> 480 min
Suitable material	polyvinylchloride
Evaluation	Information derived from practical experience
Glove thickness	approx 0.8 mm

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

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

Environmental exposure controls
Use product only in closed system. 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	mild
Odour threshold	No data available
Melting point/freezing point	-83 °C (Pour point)
Method	DIN ISO 3016
Boiling point or initial boiling point and boiling range	228 °C @ 1013 hPa
Method	OECD 103
Flammability	Even if not classified as flammable, the product is capable of catching fire or being set on fire.
Lower explosion limit	0,8 Vol %
Upper explosion limit	6,7 Vol %
Flash point	116 °C @ 1013 hPa
Method	closed cup, DIN EN ISO 2719
Autoignition temperature	395 °C @ 1014 hPa
Method	DIN 51794
Decomposition temperature	No data available
pH	3,75 (1 g/l in water @ 25 °C (77 °F)) DIN 19268
Kinematic Viscosity	8,410 mm²/s @ 20 °C
Method	ASTM D445
Solubility	1,5 g/l @ 20 °C, in water, OECD 105
Partition coefficient n-octanol/water (log value)	2,7 @25 °C (77 °F), pH 4,7 OECD 107 3,0 @25°C (77 °F), pH 3,0 OECD 117

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method

0,04	0,004	< 0,001	20	68
4,3	0,43	0,004	50	122

Density and/or relative density

Values	@ °C	@ °F	Method
0,9067	20	68	DIN 51757

Relative vapour density 5,0 (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 144,21
Molecular formula C8 H16 O2
log Koc ≤ 2,15 at ambient temperature OECD 106
Dissociation constant pKa 4,9 @ 21 °C (69 °F) OECD 112
Refractive index 1,425 @ 20 °C
Surface tension 43,2 mN/m @ 20 °C (68 °F), OECD 115
Evaporation rate No data available

SECTION 10: Stability and Reactivity

10.1. Reactivity

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

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid

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

10.5. Incompatible materials

bases, amines, 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-Ethylhexanoic acid (149-57-5)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	2043 mg/kg	rat, female	OECD 401
Dermal	LD50	> 2000 mg/kg	rat, male/female	OECD 402
Inhalative	LC0	0,11 mg/l (8 h)	rat, male/female	OECD 403

2-Ethylhexanoic acid, CAS: 149-57-5
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-Ethylhexanoic acid (149-57-5)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	Mild skin irritation	OECD 404	4h
Eyes	rabbit	No eye irritation	OECD 405	24h

2-Ethylhexanoic acid, CAS: 149-57-5
Assessment
Based on available data, the classification criteria are not met for:
skin irritation/corrosion
eye irritation/corrosion
For respiratory irritation, no data are available

Sensitization				
2-Ethylhexanoic acid (149-57-5)				
Target Organ Effects	Species	Evaluation	Method	
Skin	guinea pig	not sensitizing	OECD 406	2 %, aqueous solution

2-Ethylhexanoic acid, CAS: 149-57-5
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-Ethylhexanoic acid (149-57-5)				
Type	Dose	Species	Method	
Subchronic toxicity	NOAEL: ~ 200 mg/kg/d (90d)	mouse, male/female	EPA OTS 795.2600	Oral
Subchronic toxicity	NOAEL: ~300 mg/kg/d (90d)	rat, male/female	EPA OTS 795.2600	Oral
Subacute toxicity	NOAEL: 200 mg/kg/d (15d)	rat, male/female	OECD 407	Oral
Subacute toxicity***	NOEL: ~ 800 mg/kg/d (15d)***	mouse male***	OECD 407***	Oral***

2-Ethylhexanoic acid, CAS: 149-57-5
Assessment
Based on available data, the classification criteria are not met for:

STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity					
2-Ethylhexanoic acid (149-57-5)					
Type	Dose	Species	Evaluation	Method	
Developmental Toxicity	NOAEL 25 mg/kg/d	rabbit		EPA OTS 798.4900 Oral***	Maternal toxicity
Developmental Toxicity	NOAEL 250 mg/kg/d	rabbit		EPA OTS 798.4900 Oral***	Developmental toxicity
Developmental Toxicity	NOAEL >250 mg/kg/d	rat		EPA OTS 798.4900 Oral***	Maternal toxicity
Developmental Toxicity	NOAEL 100 mg/kg/d	rat		EPA OTS 798.4900 Oral***	Developmental toxicity
Reproductive toxicity	NOAEL 250 mg/kg/d	rat, parental		Oral OECD 443	
Reproductive toxicity	NOAEL 800 mg/kg/d	rat, 1. Generation, male/female		Oral OECD 443	
Mutagenicity		CHO (Chinese Hamster Ovary) cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Mutagenicity		mouse lymphoma cells	negative	OECD 476 (Mammalian Gene Mutation)	
Mutagenicity		Escherichia coli Salmonella typhimurium***	negative	OECD 471 (Ames)	In vitro study
Mutagenicity		rat lymphocytes	negative	OECD 473 (Chromosomal Aberration)	In vitro study
Mutagenicity		mouse male/female	negative	OECD 474	Oral micronucleus test

2-Ethylhexanoic acid, CAS: 149-57-5
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
Directive 1272/2008/EC, Annex VI: Repr. 2
Evaluation
In vitro tests showed mutagenic effects
Did not show carcinogenic effects in animal experiments
No indication for a carcinogenic potential

2-Ethylhexanoic acid, CAS: 149-57-5
Target Organ Systemic Toxicant - Single exposure
Based on available data, the classification criteria are not met for:
STOT SE
Target Organ Systemic Toxicant - Repeated exposure
Based on available data, the classification criteria are not met for:
STOT RE
Aspiration toxicity
no data available

11.2. Information on other hazards

Endocrine disrupting properties
The substance has not been identified as having endocrine disrupting properties in accordance with section 2.3.
2-Ethylhexanoic acid, CAS: 149-57-5
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-Ethylhexanoic acid (149-57-5)			
Species	Exposure time	Dose	Method
Oryzias latipes (Medaka)	96h	LC50: > 100 mg/l	OECD 203 read across
Daphnia magna (Water flea)	48h	EC50: 913 mg/l	OECD 202 read across***
Desmodesmus subspicatus	72h	EC50: 49,3 mg/l (Growth rate)	DIN 38412, part 9
Pseudomonas putida	17 h	EC50: 112,1 mg/l (Growth inhibition)	DIN 38412, part 8
Pseudokirchneriella subcapitata***	72h***	LC50: 485,1 mg/l***	OECD 201 read across***

Long term toxicity				
2-Ethylhexanoic acid (149-57-5)				
Type	Species	Dose	Method	
Reproductive toxicity	Daphnia magna (Water flea)	NOEC: 25 mg/l (21d)***	OECD 211	
Reproductive toxicity	Daphnia magna (Water flea)	NOEC: 18 mg/l	OECD 211	read across
Aquatic toxicity	Desmodesmus subspicatus	EC10: 32 mg/l (72 h)	DIN 38412 / part 9	
Aquatic toxicity	Pseudokirchneriella subcapitata	NOEC: 130 mg/l (3d) Growth rate	OECD 201	read across
Aquatic toxicity***	Fish***	ChV: 29,4 mg/l (30 d)***	calculated***	

12.2. Persistence and degradability

2-Ethylhexanoic acid, CAS: 149-57-5
Biodegradation
99 % (28 d), Sewage, domestic, aerobic, OECD 301 E.

Abiotic Degradation		
2-Ethylhexanoic acid (149-57-5)		
Type	Result	Method
Photolysis	Half-life (DT50): 47,1 h	calculated
Hydrolysis	not expected	

12.3. Bioaccumulative potential

2-Ethylhexanoic acid (149-57-5)		
Type	Result	Method
log Pow	3,0 @ 25 °C (77 °F)	measured, OECD 107

12.4. Mobility in soil

2-Ethylhexanoic acid (149-57-5)		
Type	Result	Method
Adsorption/Desorption	Koc: ≤ 140,87 at ambient temperature	OECD 106
Surface tension	43,2 mN/m @ 20 °C (68 °F)***	OECD 115
Distribution to environmental compartments	Air: 0,93 Soil: 3,64 Water: 91,7 Sediment: 11,2	Calculation according Mackay, Level I

12.5. Results of PBT and vPvB assessment

2-Ethylhexanoic acid, CAS: 149-57-5
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-Ethylhexanoic acid, CAS: 149-57-5
No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

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

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

SECTION 14: Transport information

Section 14.1 - 14.6

Not restricted

ADR/RID

ADN

ADN Container
Not restricted

ADN

ADN Tanker

14.1. UN number or ID number	ID 9006
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s.
14.3. Transport hazard class(es)	9
Subsidiary Risk	N3, F
14.4. Packing group	-
14.5. Environmental hazards	Fish and tree
14.6. Special precautions for user	no data available

ICAO-TI / IATA-DGR

Not restricted

IMDG

Not restricted

14.7. Maritime transport in bulk according to IMO instruments

Product name	2-Ethylhexanoic acid
Ship type	3
Pollution category	Y
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-Ethylhexanoic acid, CAS: 149-57-5

Classification	Repr. 1B; H360D***
Hazard pictograms	GHS08 Health hazard
Signal word	Danger***
Hazard statements	H360D***

DI 2012/18/EU (Seveso III)

Category	not subject

DI 1999/13/EC (VOC Guideline)

Component	Status
2-Ethylhexanoic acid CAS: 149-57-5	not subject

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

Component	Status

2-Ethylhexanoic acid CAS: 149-57-5	The substance is/will be pre-registered

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

Other regulations

2-Ethylhexanoic acid, CAS: 149-57-5
DI 92/85/EEC
EU REACh Annex XVII, App. 6***

International Inventories

2-Ethylhexanoic acid, CAS: 149-57-5
AICS (AU)
DSL (CA)
IECSC (CN)
EC-No. 205-743-6 (EU)***
ENCS (2)-608 (JP)
ISHL (2)-608 (JP)
KECI KE-13740 (KR)
INSQ (MX)
PICCS (PH)
TSCA (US)
NZIoC-NZ with note***
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
H360D: May damage the unborn child***

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

The Annex does not match other SDS sections content and will be updated as soon as possible
A quantitative approach used to conclude safe use for:
Environmental compartment
Long-term Systemic effects via inhalation
Long-term Systemic effects via skin
Qualitative approach used to conclude safe use.
Acute local hazards via inhalation
Acute systemic hazards via skin
Acute local hazards via skin
Local hazards via eyes

Other combinations of operational conditions may also be safe. Please contact OQ in case your local operational conditions differ from the ones described below and you are unsure if they are also safe***

Operational conditions and risk management measures
Following operational conditions and risk management measures, are based on qualitative risk characterisation:
Wear suitable coveralls to prevent exposure to skin, where direct contact with substances is possible
Avoid direct contact with the chemical/the product/the preparation by establishing organisational measures
Wear protective gloves and eye/face protection
Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Avoidance of contact with contaminated tools and objects
Clean up spill immediately.
Workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and to report skin/eye problems that may develop

Exposure scenario identification

1 **Industrial use resulting in manufacture of another substance (use of intermediates)**
2 **Formulation & (re)packing of substances and mixtures**
3 **Use in laboratories**
4 **Use in laboratories**
5 **Functional Fluids**
6 **Functional Fluids**

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

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)
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Environmental release categories [ERC]
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics
Refer to attached safety data sheets

Further explanations
Industrial use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

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

Further specification
release factors for (Sp)ERC were modified
Amounts used
Daily amount per site: 50 to
Annual amount per site: 5000 to
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
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: 0.1 %
Release fraction to soil from process: 0.1%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000

The minimum grade of elimination in the sewage plant is (%): 87.5
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

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

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

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

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

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

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

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

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 0.312 mg/l; RCR: 0.867
Fresh Water (Sediment)	PEC: 5.52 mg/kg dw; RCR: 0.867
Marine Water (Pelagic)	PEC: 0.031 mg/l; RCR: 0.867
Marine Water (Sediment)	PEC: 0.552 mg/kg dw; RCR: 0.867
Agricultural Soil	PEC: 0.968 mg/kg dw; RCR: 0.913
Sewage Treatment Plant (Effluent)	PEC: 3.121 mg/l; RCR: 0.044
Man via environment – Inhalation	Concentration in air: 3.81E-3 mg/m³; RCR: <0.01

Human exposure prediction (oral, dermal, inhalative)
EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Oral exposure is not expected to occur.

Proc 1	EE(inhal): 0.06; EE(derm): 0.034
Proc 2	EE(inhal): 6.009; EE(derm): 0.274
Proc 3	EE(inhal): 12.62; EE(derm): 0.138
Proc 8b	EE(inhal): 5.408; EE(derm): 0.685

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm).

Proc 1	RCR(inhal): <0.01; RCR(derm): 0.021
Proc 2	RCR(inhal): 0.429; RCR(derm): 0.137
Proc 3	RCR(inhal): 0.901; RCR(derm): 0.069
Proc 8b	RCR(inhal): 0.386; RCR(derm): 0.343

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]
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)

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

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

Further explanations
Industrial use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently).
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

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

Further specification
release factors for (Sp)ERC were modified.
Amounts used
Daily amount per site: 4.5 to
Annual amount per site: 1000 to
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0 %
Release fraction to wastewater from process: 0.5 %
Release fraction to soil from process: 0%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

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

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

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

Product characteristics
Liquid
Frequency and duration of use

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

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

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

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

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

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 good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

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 1 hour
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

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 good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

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 good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 0.142 mg/l; RCR: 0.394
Fresh Water (Sediment)	PEC: 2.512 mg/kg dw; RCR: 0.394
Marine Water (Pelagic)	PEC: 0.014 mg/l; RCR: 0.395
Marine Water (Sediment)	PEC: 0.251 mg/kg dw; RCR: 0.394
Agricultural Soil	PEC: 0.44 mg/kg dw; RCR: 0.415
Sewage Treatment Plant (Effluent)	PEC: 1.42 mg/l; RCR: 0.02
Man via environment – Inhalation	Concentration in air: 3.63E-6 mg/m³; RCR: <0.01
Man via environment – Oral	Exposure via food consumption: 9.63E-3 mg/kg bw/day; 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]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d].

Proc 1	EE(inhal): 0.06; EE(derm): 0.034
Proc 2	EE(inhal): 6.009; EE(derm): 0.274
Proc 3	EE(inhal): 12.62; EE(derm): 0.138

Proc 4	EE(inhal): 9.013; EE(derm): 0.343
Proc 5	EE(inhal): 9.013; EE(derm): 0.685
Proc 8a	EE(inhal): 3.605; EE(derm): 0.685
Proc 8b	EE(inhal): 9.013; EE(derm): 0.685
Proc 9	EE(inhal): 0.644; EE(derm): 0.343

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm).

Proc 1	RCR(inhal): < 0.01; RCR(derm): 0.017
Proc 2	RCR(inhal): 0.429; RCR(derm): 0.137
Proc 3	RCR(inhal): 0.901; RCR(derm): 0.069
Proc 4	RCR(inhal): 0.644; RCR(derm): 0.172
Proc 5	RCR(inhal): 0.644; RCR(derm): 0.343
Proc 8a	RCR(inhal): 0.258; RCR(derm): 0.343
Proc 8b	RCR(inhal): 0.644; RCR(derm): 0.343
Proc 9	RCR(inhal): 0.644; RCR(derm): 0.343

Number of the ES 3

Short title of the exposure scenario

Use in laboratories

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]
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
Use of the substance within laboratory settings, including material transfers and equipment cleaning

Further explanations
Industrial use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently).
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

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

ERC 4

Amounts used
Daily amount per site: 0.01 to
Annual amount per site: 5 to
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 1 %
Release fraction to wastewater from process: 0.5 %
Release fraction to soil from process: 0.1%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.52
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario 2
Contributing exposure scenario controlling worker exposure for PROC 15

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

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 0.062 mg/l; RCR: 0.174
Fresh Water (Sediment)	PEC: 1.105 mg/kg dw; RCR: 0.173
Marine Water (Pelagic)	PEC: 6.25E-3 mg/l; RCR: 0.174
Marine Water (Sediment)	PEC: 0.111 mg/kg dw; RCR: 0.173
Agricultural Soil	PEC: 0.194 mg/kg dw; RCR: 0.183
Sewage Treatment Plant (Effluent)	PEC: 0.624 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]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 15	EE(inhal): 3.004; EE(derm): 0.34

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm).

Proc 15	RCR(inhal): 0.215; RCR(derm): 0.17

Number of the ES 4

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]
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 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented

Contributing Scenarios

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

Amounts used
daily wide dispersive use: 0.0000027 to/d
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 100 %
Release fraction to wastewater from process: 100 %
Release fraction to soil from process: 0%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

Number of the contributing scenario 2
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics

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

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 7.76E-5 mg/l; RCR: <0.01
Fresh Water (Sediment)	PEC: 1.37E-3 mg/kg dw; RCR: <0.01
Marine Water (Pelagic)	PEC: 7.32E-6 mg/l; RCR: <0.01
Marine Water (Sediment)	PEC: 1.29E-4 mg/kg dw; RCR: <0.01
Agricultural Soil	PEC: 6.1E-5 mg/kg dw; RCR: <0.01
Sewage Treatment Plant (Effluent)	PEC: 1.72E-4 mg/l; RCR: <0.01
Man via environment – Inhalation	Concentration in air: 6.53E-7 mg/m³; RCR: <0.01
Man via environment – Oral	Exposure via food consumption: 8.41E-6 mg/kg bw/day; 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]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 15	EE(inhal): 6.009; EE(derm): 0.34

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

Proc 15	RCR(inhal): 0.429; RCR(derm): 0.17

Number of the ES 5

Short title of the exposure scenario
Functional Fluids

List of use descriptors

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

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

Product characteristics
Refer to attached safety data sheets

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

Further explanations
Industrial use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Contributing Scenarios

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

Further specification
release factors for (Sp)ERC were modified.
Amounts used
Daily amount per site: 3 to
Annual amount per site: 300 to
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 1 %
Release fraction to wastewater from process: 1 %
Release fraction to soil from process: 1%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

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

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

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

PROC 2

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

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

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

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 use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

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

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

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

PROC 8b

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

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 9

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

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 0.187 mg/l; RCR: 0.52
Fresh Water (Sediment)	PEC: 3.312 mg/kg dw; RCR: 0.52
Marine Water (Pelagic)	PEC: 0.019 mg/l; RCR: 0.52
Marine Water (Sediment)	PEC: 0.331 mg/kg dw; RCR: 0.52
Agricultural Soil	PEC: 0.581 mg/kg dw; RCR: 0.548
Sewage Treatment Plant (Effluent)	PEC: 1.873 mg/l; RCR: 0.026
Man via environment – Inhalation	Concentration in air: 2.29E-3 mg/m³; RCR: < 0.01
Man via environment – Oral	Exposure via food consumption: 0.01 mg/kg bw/day; 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]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.06; EE(derm): 0.034
Proc 2	EE(inhal): 6.009; EE(derm): 0.274
Proc 3	EE(inhal): 12.62; EE(derm): 0.069
Proc 4	EE(inhal): 9.013; EE(derm): 0.343
Proc 8a	EE(inhal): 10.82; EE(derm): 0.411
Proc 8b	EE(inhal): 5.408; EE(derm): 0.411
Proc 9	EE(inhal): 5.408; EE(derm): 0.412

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm).

Proc 1	RCR(inhal): < 0.01; RCR(derm): 0.017
Proc 2	RCR(inhal): 0.429; RCR(derm): 0.137
Proc 3	RCR(inhal): 0.901; RCR(derm): 0.035
Proc 4	RCR(inhal): 0.644; RCR(derm): 0.172
Proc 8a	RCR(inhal): 0.773; RCR(derm): 0.206
Proc 8b	RCR(inhal): 0.386; RCR(derm): 0.206
Proc 9	RCR(inhal): 0.386; RCR(derm): 0.206

Number of the ES 6

Short title of the exposure scenario

Functional Fluids

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

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

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

Product characteristics
Refer to attached safety data sheets

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

Further explanations
Professional use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes a basic standard of occupational Health and Safety Management System

Contributing Scenarios

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

Further specification
release factors for (Sp)ERC were modified.
Amounts used
daily wide dispersive use: 0.00011 to/d
Fraction of EU tonnage used in region: 0.1
Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 0.5%
Release fraction to wastewater from process: 0.5%
Release fraction to soil from process: 0.5%
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5
Conditions and measures related to external treatment of waste for disposal
Dispose of waste product or used containers according to local regulations

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

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

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

Product characteristics
Covers percentage substance in the product up to 25 %
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

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

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

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

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

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

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

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

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 20

Product characteristics
Covers percentage substance in the product up to 25 %
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Exposure estimation and reference to its source

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

Fresh Water (Pelagic)	PEC: 9.47E-5 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 1.68E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 9.04E-6 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 1.6E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 1.14E-4 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 3.43E-4 mg/l; RCR: < 0.01
Man via environment – Inhalation	Concentration in air: 6.53E-7 mg/m³; RCR: < 0.01
Man via environment – Oral	Exposure via food consumption: 1.02E-5 mg/kg bw/day; 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]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.06; EE(derm): 0.034
Proc 2	EE(inhal): 12.62; EE(derm): 0.082
Proc 3	EE(inhal): 10.82; EE(derm): 0.083
Proc 8a	EE(inhal): 5.408; EE(derm): 0.823
Proc 9	EE(inhal): 10.82; EE(derm): 0.412
Proc 20	EE(inhal): 12.62; EE(derm): 0.103

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm).

Proc 1	RCR(inhal): < 0.01; RCR(derm): 0.017
Proc 2	RCR(inhal): 0.901; RCR(derm): 0.041
Proc 3	RCR(inhal): 0.773; RCR(derm): 0.041
Proc 8a	RCR(inhal): 0.386; RCR(derm): 0.411
Proc 9	RCR(inhal): 0.773; RCR(derm): 0.206
Proc 20	RCR(inhal): 0.901; RCR(derm): 0.051

Exposure estimation and reference to its source

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

associated uses:

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