SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 15.09.2018 Version 12.6

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

1.1 Product identifier

Catalogue No.	805740
Product name	2-Mercaptoethanol for synthesis
REACH Registration Number	01-2119517582-41-XXXX
CAS-No.	60-24-2

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

Identified uses	Chemical for synthesis In compliance with the conditions described in the annex to this safety data sheet.

1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 3, Oral, H301
Acute toxicity, Category 3, Inhalation, H331
Acute toxicity, Category 2, Dermal, H310
Skin irritation, Category 2, H315
Serious eye damage, Category 1, H318
Skin sensitisation, Category 1, H317
Specific target organ toxicity - repeated exposure, Category 2, Oral, Liver, Heart, H373
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410

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

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms

Signal word

Danger

Hazard statements

H301 + H331 Toxic if swallowed or if inhaled.
H310 Fatal in contact with skin.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H373 May cause damage to organs (Liver, Heart) through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P273 Avoid release to the environment.
P280 Wear eye protection.
Response
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Reduced labelling (≤125 ml)

Hazard pictograms

Signal word
Danger

Hazard statements
H301 + H331 Toxic if swallowed or if inhaled.
H310 Fatal in contact with skin.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.

Precautionary statements
P280 Wear eye protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

CAS-No. 60-24-2

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

Formula	$HSCH_2CH_2OH$	C_2H_6OS (Hill)
EC-No.	200-464-6	
Molar mass	78,13 g/mol	

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No.	Registration number	Classification
Mercaptoethanol (<= 100 %)		
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.		
60-24-2	01-2119517582-41-XXXX	Acute toxicity, Category 3, H301 Acute toxicity, Category 3, H331 Acute toxicity, Category 2, H310 Skin irritation, Category 2, H315 Serious eye damage, Category 1, H318 Skin sensitisation, Category 1, H317 Specific target organ toxicity - repeated exposure, Category 2, H373 Acute aquatic toxicity, Category 1, H400 Chronic aquatic toxicity, Category 1, H410 M-Factor: 1

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

3.2 Mixture

Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

4.2 Most important symptoms and effects, both acute and delayed

Irritation and corrosion, Allergic reactions
Risk of serious damage to eyes.
Cough, Shortness of breath, narcosis, Nausea, Vomiting, Convulsions, CNS disorders, collapse
Risk of corneal clouding.

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water, Foam, Carbon dioxide (CO2), Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Combustible.
Vapours are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.
Fire may cause evolution of:

Sulphur oxides, hydrogen sulphide

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Observe label precautions.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL)

Worker DNEL, acute	Systemic effects	inhalation	4 mg/m³
Worker DNEL, longterm	Systemic effects	inhalation	4 mg/m³
Worker DNEL, longterm	Systemic effects	dermal	0,6 mg/kg Body weight

Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,0004 mg/l
PNEC Marine water	0,00004 mg/l
PNEC Aquatic intermittent release	0,004 mg/l
PNEC Sewage treatment plant	60 mg/l
PNEC Fresh water sediment	0,0015 mg/kg
PNEC Marine sediment	0,00015 mg/kg
PNEC Soil	0,000063 mg/kg

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Tightly fitting safety goggles

Hand protection

full contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm
Break through time:	480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0,40 mm
Break through time:	120 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 730 Camatril® -Velours (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment

Flame retardant antistatic protective clothing.

Respiratory protection

required when vapours/aerosols are generated.
Recommended Filter type: Filter B-(P3)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls

Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	colourless
Odour	characteristic
Odour Threshold	No information available.
pH	4,5 - 6 at 500 g/l 20 °C
Melting point	< -50 °C
Boiling point/boiling range	154 - 161 °C at 1.013 hPa
Flash point	70,5 °C Method: EN 22719
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	2,3 %(V)
Upper explosion limit	18 %(V)
Vapour pressure	0,76 hPa at 20 °C

Relative vapour density	2,7
Density	1,12 g/cm3 at 20 °C
Relative density	No information available.
Water solubility	at 20 °C soluble
Partition coefficient: n-octanol/water	log Pow: -0,056 (25 °C) (experimental) (IUCLID) Bioaccumulation is not expected.
Auto-ignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	3,4 mPa.s at 20 °C
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

Ignition temperature	295 °C Method: DIN 51794

SECTION 10. Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability

sensitive to moisture

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents

A risk of explosion and/or of toxic gas formation exists with the following substances:

Acids

10.4 Conditions to avoid

Strong heating.

10.5 Incompatible materials

no information available

10.6 Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

LD50 Rat: 98 - 162 mg/kg

OECD Test Guideline 401

(External MSDS)

Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

Acute inhalation toxicity

LC50 Rat: 2,03 mg/l; 4 h ; vapour

(ECHA)

Symptoms: Possible damages:, mucosal irritations, Cough, Shortness of breath

Acute dermal toxicity

LD50 Rabbit: ca. 112 - 224 mg/kg

(ECHA)

Skin irritation

Rabbit

Result: Irritations

OECD Test Guideline 404

(External MSDS)

Causes skin irritation.

Eye irritation

Rabbit

Result: Severe irritations

Draize Test

(External MSDS)

Causes serious eye damage.

Risk of corneal clouding.

Sensitisation

Maximisation Test Guinea pig

Result: positive

Method: OECD Test Guideline 406

(External MSDS)

May cause an allergic skin reaction.

Germ cell mutagenicity

Genotoxicity in vivo

Chromosome aberration test

Mouse

male and female

i.p.

Result: negative

Method: OECD Test Guideline 474

(ECHA)

Genotoxicity in vitro

Ames test

Result: negative

(Lit.)

Mutagenicity (mammal cell test):

Mouse lymphoma test

Result: negative

Method: OECD Test Guideline 476

(ECHA)

Mutagenicity (mammal cell test): chromosome aberration.

Human lymphocytes

Result: negative

Method: OECD Test Guideline 473

(ECHA)

Carcinogenicity

This information is not available.

Reproductive toxicity

No impairment of reproductive performance suspected. (External MSDS)

Teratogenicity

Application Route: Oral

Rat

Number of exposures: daily

Method: OECD Test Guideline 414

Did not show teratogenic effects in animal experiments. (ECHA)

Specific target organ toxicity - single exposure

This information is not available.

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Exposure routes: Ingestion

Target Organs: Liver, Heart

Repeated dose toxicity

Rat

male and female

Oral

49 d

daily

NOAEL: 15 mg/kg

LOAEL: 50 mg/kg

OECD Test Guideline 422

Target Organs: Liver, Heart

(ECHA)

The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Aspiration hazard

This information is not available.

11.2 Further information

Systemic effects:

CNS disorders, Nausea, Vomiting, Convulsions, narcosis, collapse

The following applies to mercaptans in general: offensive odour.

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

SECTION 12. Ecological information

12.1 Toxicity

Toxicity to fish

static test LC50 Leuciscus idus (Golden orfe): 37 mg/l; 96 h

DIN 38412 T15

Toxicity to daphnia and other aquatic invertebrates

static test EC50 Daphnia magna (Water flea): 0,4 mg/l; 48 h

OECD Test Guideline 202

Toxicity to algae

static test EC50 Desmodesmus subspicatus (green algae): 19 mg/l; 72 h

Analytical monitoring: yes

OECD Test Guideline 201

Toxicity to bacteria

static test EC50 Pseudomonas putida: 125 mg/l; 17 h

DIN 38412

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

semi-static test NOEC Daphnia magna (Water flea): > 0,0632 mg/l; 21 d

OECD Test Guideline 211

12.2 Persistence and degradability

Biodegradability

< 10 %; 28 d; aerobic

OECD Test Guideline 301A

Not readily biodegradable.

69 %; 60 d; aerobic

OECD Test Guideline 310

Not rapidly biodegradable

Biochemical Oxygen Demand (BOD)

105 mg/g (5 d)

(IUCLID)

Chemical Oxygen Demand (COD)

1,894 mg/g

(IUCLID)

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: -0,056 (25 °C)

(experimental)

(IUCLID) Bioaccumulation is not expected.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 2966
14.2 Proper shipping name	THIOGLYCOL
14.3 Class	6.1
14.4 Packing group	II
14.5 Environmentally hazardous	yes
14.6 Special precautions for user	yes
Tunnel restriction code	D/E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 2966
14.2 Proper shipping name	THIOGLYCOL
14.3 Class	6.1
14.4 Packing group	II
14.5 Environmentally hazardous	yes
14.6 Special precautions for user	no

Sea transport (IMDG)

14.1 UN number	UN 2966
14.2 Proper shipping name	THIOGLYCOL
14.3 Class	6.1
14.4 Packing group	II
14.5 Environmentally hazardous	yes
14.6 Special precautions for user	yes
EmS	F-A S-A

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

Not relevant

SECTION 15. Regulatory information

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

EU regulations

Major Accident Hazard	SEVESO III
Legislation	ACUTE TOXIC H2 Quantity 1: 50 t Quantity 2: 200 t SEVESO III ENVIRONMENTAL HAZARDS E1 Quantity 1: 100 t Quantity 2: 200 t
Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated

Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).

National legislation

Storage class	6.1A

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H301	Toxic if swallowed.
H310	Fatal in contact with skin.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H373	May cause damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Training advice

Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms

Signal word

Danger

Hazard statements

H227 Combustible liquid.

H301 + H331 Toxic if swallowed or if inhaled.

H310 Fatal in contact with skin.

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H318 Causes serious eye damage.

H373 May cause damage to organs (Liver, Heart) through prolonged or repeated exposure if swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P273 Avoid release to the environment.

P280 Wear eye protection.

Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.

EXPOSURE SCENARIO 1 (Industrial use)

1. Industrial use Chemical for synthesis)

Sectors of end-use

SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
SU9	Manufacture of fine chemicals
SU 10	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Chemical product category

PC19	Intermediate
PC21	Laboratory chemicals

Process categories

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

ERC2	Formulation of preparations
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC2

Amount used

Annual amount per site	200 t
Daily amount per site (Msafe)	6,8 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	350
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,1 %

2.2 Contributing scenario controlling environmental exposure for: ERC4

Amount used

Annual amount per site	65 t
Daily amount per site (Msafe)	20,9 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	350
Emission or Release Factor: Air	1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,1 %

2.3 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

Annual amount per site	250 t
Daily amount per site (Msafe)	22,7 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	350
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,1 %

2.4 Contributing scenario controlling environmental exposure for: ERC6b

Amount used

Annual amount per site	50 t
Daily amount per site (Msafe)	26,5 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	365
Emission or Release Factor: Air	0,001 %
Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0,001 %

2.5 Contributing scenario controlling worker exposure for: PROC1

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	< 46 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

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

Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Use suitable eye protection.

2.6 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	< 46 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Use suitable eye protection.

2.7 Contributing scenario controlling worker exposure for: PROC8a

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	< 46 °C

Frequency and duration of use

Frequency of use	60 minutes/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid carrying out operation for more than 1 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. Use suitable eye protection.

3. Exposure estimation and reference to its source

Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2	6,8 kg/day	Marine sediment	1	ECETOC TRA
2.2	ERC4	20,9 kg/day	Marine water	1	ECETOC TRA
2.3	ERC6a	22,7 kg/day	Marine sediment	1	ECETOC TRA
2.4	ERC6b	26,5 kg/day	Marine sediment	1	ECETOC TRA

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.5	PROC1	acute, inhalative, systemic	0,02	ECETOC TRA, modified
		longterm, inhalative, systemic	0,008	ECETOC TRA, modified
2.6	PROC2	acute, inhalative, systemic	0,16	ECETOC TRA, modified
		longterm, inhalative, systemic	0,08	ECETOC TRA, modified
2.6	PROC3	acute, inhalative, systemic	0,49	ECETOC TRA, modified
		longterm, inhalative, systemic	0,24	ECETOC TRA, modified
2.6	PROC4	acute, inhalative, systemic	0,81	ECETOC TRA, modified
		longterm, inhalative, systemic	0,41	ECETOC TRA, modified
2.6	PROC5	acute, inhalative, systemic	0,81	ECETOC TRA, modified
		longterm, inhalative, systemic	0,41	ECETOC TRA, modified
2.6	PROC8b	acute, inhalative, systemic	0,24	ECETOC TRA, modified
		longterm, inhalative, systemic	0,12	ECETOC TRA, modified
2.6	PROC9	acute, inhalative, systemic	0,81	ECETOC TRA, modified
		longterm, inhalative, systemic	0,41	ECETOC TRA, modified
2.6	PROC15	acute, inhalative, systemic	0,81	ECETOC TRA, modified
		longterm, inhalative, systemic	0,41	ECETOC TRA, modified
2.7	PROC8a	acute, inhalative, systemic	0,81	ECETOC TRA, modified
		longterm, inhalative, systemic	0,16	ECETOC TRA, modified

The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).
For (other) acute and local effects risk management measures are based on qualitative risk characterisation.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool ScIDeEx® at www.merckmillipore.com/scideex.

EXPOSURE SCENARIO 2 (Professional use)

1. Professional use Chemical for synthesis)

Sectors of end-use

SU 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Chemical product category

PC21 Laboratory chemicals

Process categories

PROC15 Use as laboratory reagent

Environmental Release Categories

ERC2 Formulation of preparations

ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

ERC6b Industrial use of reactive processing aids

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC2

Amount used

Annual amount per site	200 t
Daily amount per site (Msafe)	6,8 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	350
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,1 %

2.2 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

Annual amount per site	250 t
Daily amount per site (Msafe)	22,7 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	350
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,1 %

2.3 Contributing scenario controlling environmental exposure for: ERC6b

Amount used

Annual amount per site	50 t
Daily amount per site (Msafe)	26,5 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	365
Emission or Release Factor: Air	0,001 %
Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0,001 %

2.4 Contributing scenario controlling worker exposure for: PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	< 46 °C

Frequency and duration of use

Frequency of use	60 minutes/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid carrying out operation for more than 1 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. Use suitable eye protection.

3. Exposure estimation and reference to its source

Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2	6,8 kg/day	Marine sediment	1	ECETOC TRA
2.2	ERC6a	22,7 kg/day	Marine sediment	1	ECETOC TRA
2.3	ERC6b	26,5 kg/day	Marine sediment	1	ECETOC TRA

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.4	PROC15	acute, inhalative, systemic	0,81	ECETOC TRA, modified
		longterm, inhalative, systemic	0,16	ECETOC TRA, modified

The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).
For (other) acute and local effects risk management measures are based on qualitative risk characterisation.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool ScIDeEx® at www.merckmillipore.com/scideex.