

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

Printed 20.08.2018
Revision 17.08.2018 (GB) Version 2.0
Coolex® N
1680



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

1.1. Product identifier

Name of product Coolex® N
Art-Nr(n): 1680

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

Identified uses

Product categories [PC]

PC16 - Heat transfer fluids
PC17 - Hydraulic fluids

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.
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
PROC11 - Non industrial spraying
PROC15 - Use as laboratory reagent
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems

Environmental release categories [ERC]

ERC7 - Industrial use of substances in closed systems
ERC8a - Wide dispersive indoor use of processing aids in open systems
ERC8d - Wide dispersive outdoor use of processing aids in open systems
ERC9a - Wide dispersive indoor use of substances in closed systems
ERC9b - Wide dispersive outdoor use of substances in closed systems

Recommended intended purpose(s)

Cooling liquid brine.
Convector fluid.
Functional fluid.

1.3. Details of the supplier of the safety data sheet

Manufacturer/distributor

GHC Gerling, Holz & Co. Handels GmbH
Ruhrstraße 113, D-22761 Hamburg
Phone +49 40 853 123-0, Fax +49 40 853 123-66
E-Mail hamburg@ghc.de
Internet www.ghc.com

Advice

GHC Gerling, Holz & Co. Handels GmbH
Phone +49 40 853 123-0
Fax +49 40 853 123-66
E-mail (competent person):
msds@ghc.de

1.4. Emergency telephone number

Emergency advice

Giftinformationszentrum (Poison Control Centre) Mainz
Phone +49 6131 19240

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! SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard classes and Hazard categories Hazard Statements Classification procedure

Acute Tox. 4 **H302**
STOT RE 2 **H373**

Hazard statements for health hazards

H302 **Harmful if swallowed.**

H373 **May cause damage to kidneys through prolonged or repeated exposure by swallowing.**

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]



GHS07



GHS08

Signal word

Warning

Hazard statements for health hazards

H302 **Harmful if swallowed.**

H373 **May cause damage to kidneys through prolonged or repeated exposure by swallowing.**

Precautionary Statements

Prevention

P260 Do not breathe mist/vapours/spray.

Response

P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor/.../ if you feel unwell.

P330 Rinse mouth.

Hazardous ingredients for labeling

ethanediol

2.3. Other hazards

! Information pertaining to special dangers for human and environment

No additional hazards are known except those derived from the labelling.

! Results of PBT and vPvB assessment

The substances in this mixture do not meet the PBT/vPvB criteria of REACH, annex XIII.

SECTION 3: Composition/ information on ingredients

3.1. Substances

not applicable

3.2. Mixtures

Hazardous ingredients

CAS No	EC No	Name	[% weight]	Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]
107-21-1	203-473-3	ethanediol	90 - 95	Acute Tox. 4, H302 / STOT RE 2, H373

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REACH

CAS No	Name	REACH registration number
107-21-1	ethanediol	01-2119456816-28

! Additional advice

The text of the H-and EUH-phrases is shown in section 16.
Ethylene glycol (Ethanediol) with corrosion inhibitors.

! SECTION 4: First aid measures

4.1. Description of first aid measures

General information

Remove contaminated soaked clothing immediately.
Adhere to personal protective measures when giving first aid.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.
In the event of symptoms refer for medical treatment.

In case of skin contact

In case of contact with skin wash off immediately with plenty of water.
Consult a doctor if skin irritation persists.

! In case of eye contact

Eye rinsing with water carefully while protecting unhurt eye.
Call for a doctor immediately.
Remove contact lenses, if present and easy to do. Continue rinsing.

! In case of ingestion

Call for a doctor immediately.
Rinse out mouth thoroughly with water.
Induce vomiting.

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

Physician's information / possible symptoms

Symptoms: The most well-known symptoms and effects are described in the labeling of the product (see Section 2) and / or in the toxicological data (see section 11).

Physician's information / possible dangers

Not known.

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

Treatment (Advice to doctor)

Treat symptoms.

! SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Alcohol-resistant foam
Dry powder
Carbon dioxide
Water spray jet

Unsuitable extinguishing media

Full water jet

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5.2. Special hazards arising from the substance or mixture

In case of fire formation of dangerous gases possible.

Nitrogen oxides (NO_x)

Carbon monoxide (CO)

Carbon dioxide (CO₂)

5.3. Advice for firefighters

Special protective equipment for fire-fighters

Use breathing apparatus with independent air supply (isolated).

Wear full protective clothing.

! Additional information

Cool endangered containers with water spray jet.

Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

! SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

! For non-emergency personnel

Evacuate area.

Keep people away and stay on the upwind side.

! For emergency responders

Ensure adequate ventilation.

Remove persons to safety.

Personal protection by wearing close-fitting protective clothing and breathing apparatus.

6.2. Environmental precautions

Do not discharge into the drains/surface waters/groundwater.

Prevent spread over a wide area (e.g. by containment or oil barriers).

Do not discharge into the subsoil/soil.

6.3. Methods and material for containment and cleaning up

Take up with absorbent material (e.g. sand, kieselguhr, acid binder, general-purpose binder, sawdust).

Clean contaminated objects and floor thoroughly under consideration of environment regulations.

Flush away residues with water.

Dispose of contaminated material in accordance with regulations.

6.4. Reference to other sections

Safe handling: see section 7

Disposal: see section 13

Personal protection equipment: see section 8

! SECTION 7: Handling and storage

7.1. Precautions for safe handling

! Advice on safe handling

In case of free handling thoroughly sucking off vapours is necessary.

Avoid formation of aerosols.

Care for thoroughly room ventilation, if necessary use in well ventilated area with local exhaust ventilation at workplace.

Open and handle container with care!

Avoid release to the environment.

General protective measures

Do not inhale vapours.

Avoid contact with eyes and skin

Do not inhale aerosols

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! Hygiene measures

At work do not eat, drink and smoke.
Wash hands before breaks and after work.

Advice on protection against fire and explosion

Pay attention to general rules of internal fire prevention.

7.2. Conditions for safe storage, including any incompatibilities

! Requirements for storage rooms and vessels

Keep in closed original container.
Ventilate store-rooms thoroughly.
All regulations and local requirements for the storage of containers have to be respected.

! Advice on storage compatibility

Do not store with alkalies.
Do not store together with spontaneously flammable materials.
Do not store with gases.
Do not store together with animal feedstuffs.
Do not store together with explosives.
Do not store together with infectious substances.
Do not store together with radioactive material.
Do not store together with food.
Do not store together with oxidizing agents.

Further information on storage conditions

Store only in closed original container at cool and aired place.

7.3. Specific end use(s)

! Recommendation(s) for intended use

See section 1.2
Exposure scenarios (ES) see annex to this safety data sheet.

! SECTION 8: Exposure controls/personal protection

8.1. Control parameters

! Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m3]	[ppm]	Remark
107-21-1	Ethylene glycol (vapour)	WEL, 8 hours Short-term	52 104	20 40	EH40, UK
107-21-1	Ethylene glycol	TLV, 8 hours	100		Aerosol, ceiling limit, ACGIH, USA

Indicative occupational exposure limit values (91/322/EEC, 2000/39/EC, 2004/37/EC, 2006/15/EC or 2009/161/EU)

CAS No	Name	Code	[mg/m3]	[ppm]	Remark
107-21-1	ethanediol	8 hours Short-term	52 104	20 40	skin

DNEL-/PNEC-values

DNEL worker

CAS No	Substance name	Value	Code	Remark
107-21-1	ethanediol	106 mg/ kg bw/day	DNEL long-term dermal (systemic)	
		35 mg/m3	DNEL long-term inhalative (local)	

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DNEL Consumer

CAS No	Substance name	Value	Code	Remark
107-21-1	ethanediol	7 mg/m ³	DNEL long-term inhalative (local)	
		53 mg/kg bw/day	DNEL long-term dermal (systemic)	

PNEC

CAS No	Substance name	Value	Code	Remark
107-21-1	ethanediol	1 mg/l	PNEC aquatic, marine water	Assessment factor 100, Extrapolation
		10 mg/l	PNEC aquatic, freshwater	Assessment factor 10, Extrapolation
		10 mg/l	PNEC aquatic, intermittent release	Assessment factor 10, Extrapolation
		199,5 mg/l	PNEC sewage treatment plant (STP)	Assessment factor 10, Extrapolation
		1,53 mg/kg dw	PNEC soil	Extrapolation
		37 mg/kg dw	PNEC sediment, freshwater	Extrapolation
		3,7 mg/kg dw	PNEC sediment, marine water	Extrapolation

8.2. Exposure controls

Respiratory protection

In case of insufficient ventilation or long-term effect use breathing apparatus.

Full mask complying with EN 136.

Breathing apparatus in the event of aerosol or mist formation.

Keep self contained breathing apparatus readily available for emergency use.

Full mask, filter A

! Hand protection

Chemical-resistant protective gloves complying with EN 374.

Glove material specification [make/type, thickness, permeation time/life]: NBR; 0,4 mm; >= 30 min

Glove material specification [make/type, thickness, permeation time/life]: IIR, >= 0,7 mm, > 480 min

! Eye protection

Protective goggles according to EN 166, in case of increased risk add protective face shield.

! Other protection measures

Safety shoes with steel toe.

Body covering work clothing, or chemical resistant suit at increased risk.

! Appropriate engineering controls

Transfer and handle only in enclosed systems.

Industrial ventilation (local ventilation).

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! SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance liquid	Colour red	Odour hardly noticeable
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Odour threshold
not determined

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value	ca. 8	20 °C	100 g/l	DIN 19268	
boiling point	ca. 160 °C		1013 hPa	ASTM D 1120	
melting point	-32 °C			DIN 51583	
Flash point	119 °C			ASTM D6450 (closed cup)	
Vapourisation rate	not determined				
Flammable (solid)	not applicable				
Flammability (gas)	not applicable				
Ignition temperature	> 400 °C			DIN 51794	
Self ignition temperature	no				
Lower explosion limit	3 Vol-%				
Upper explosion limit	not determined				
Vapour pressure	< 0,1 hPa	20 °C		calculated	
Relative density	ca. 1,112 g/cm ³	20 °C		DIN 51757	
Bulk density	not applicable				
Vapour density	not determined				
Solubility in water		20 °C			multimiscible
Solubility/other	not determined				

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	Value	Temperature	at	Method	Remark
Partition coefficient n-octanol/water (log P O/W)	-1,36				Information concerns to main component.
Decomposition temperature	> 300 °C			DSC	Determination in a nitrogen atmosphere
Viscosity	not determined				
Viscosity kinematic	ca. 22,7 mm ² /s	20 °C		DIN 51562	
Oxidising properties	no				
Explosive properties	no				
9.2. Other information	Product effects hygroscopic.				

! SECTION 10: Stability and reactivity

10.1. Reactivity

See section "Possibility of hazardous reactions".

10.2. Chemical stability

Stable under recommended conditions of use and storage (see section 7).

10.3. Possibility of hazardous reactions

Reactions with oxidizing agents.
Reactions with sulphuric acid
Reactions with alkalies.

10.4. Conditions to avoid

Heat sources / heat - risk of bursting.

10.5. Incompatible materials

! Substances to avoid

Sulphuric acid, concentrated
Oxidants.
Alkalies.

10.6. Hazardous decomposition products

When handled and stored appropriately, no dangerous decomposition products are known.

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Thermal decomposition

Method DSC
Remark No decomposition below 300°C.

! SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity/Irritation/Sensitization

	Value/Validation	Species	Method	Remark
LD50 acute oral	519,54 mg/kg	rat	Calculated	
LD50 acute dermal	> 3500 mg/kg	mouse		Information concerns to main component.
LC50 acute inhalation	> 2,5 mg/l (6 h)	rat (male / female)		Information concerns to main component.
Skin irritation	non-irritant	rabbit		Information concerns to main component.
Eye irritation	non-irritant	rabbit eye		Information concerns to main component.
Skin sensitization	non-sensitizing	Guinea pig	OECD 406	Information concerns to main component.
Sensitization respiratory system	not determined			

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Subacute Toxicity	NOAEL 2200 - 4400 mg/kg (28 d) Sub-acute dermal toxicity Information concerns to main component.	Dog	OECD 410	No effects of toxicological significance.
Subchronic Toxicity	NOAEL 150 mg/kg (111 - 203 d) Subchronic oral toxicity (feed) Information concerns to main component.	Rat	OECD 408	No effects of toxicological significance.
Chronic Toxicity	NOAEL 150 mg/kg (1 a) Chronic oral toxicity (feed) Information concerns to main component.	Rat	OECD 452	No effects of toxicological significance.

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	Value	Species	Method	Validation
Mutagenicity				No experimental information on genotoxicity in vitro and in vivo available.
	Information concerns to main component.			
Reproduction-Toxicity	NOAEL > 1000 mg/kg	Rat (male / female)		No indications of toxic effects were observed in reproduction studies in animals.
	Oral Information concerns to main component.			
Carcinogenicity	NOAEL 6250 - 50000 ppm (2 a)	Mouse		No indications of carcinogenic effects are available from long-term trials.
	Oral. Information concerns to main component.			

! Specific target organ toxicity (single exposure)

Substance or mixture is not classified in GHS-criteria as specific target organ toxic with single exposure.

Specific target organ toxicity (repeated exposure)

May cause damage to kidneys through prolonged or repeated exposure by swallowing.

Aspiration hazard

no

Experiences made from practice

Symptoms of poisoning: effects on central nervous system (CNS) and gastrointestinal tract (nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse) within 30 min to 12 h.

Symptoms of poisoning: effects on cardiac and pulmonary function (acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure) within 12-24 h.

Symptoms of poisoning: renal impairment (oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits) within 24-72 h.

Symptoms of poisoning: degeneration of the central nervous system (double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain) within 6-14 days.

! Additional information

The declarations of toxicology refer to main component.

The product has not been tested. The information is derived from the properties of the individual components.

The product was classified on the basis of the calculation procedure of the Regulation (EC) No 1272/2008 [CLP/ GHS].

! SECTION 12: Ecological information**12.1. Toxicity****Ecotoxicological effects**

	Value	Species	Method	Validation
Fish	LL50 > 100 mg/l (96 h)	Danio rerio	OECD 203	Analogous to a similar product.
Daphnia	EC50 > 100 mg/l (48 h)	Daphnia magna	OECD 202	Information concerns to main component.

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	Value	Species	Method	Validation
Algae	EC50 6500 - 13000 mg/l (96 h)	Selenastrum capricornutum		Information concerns to main component.
Bacteria	EC20 > 1995 mg/l (30 min)	activated sludge (kom.)	ISO 8192	Information concerns to main component.

12.2. Persistence and degradability

	Elimination rate	Method of analysis	Method	Validation
Biological degradability	90 - 100 %		OECD 301 A	The product is readily biodegradable to OECD criteria.

Information concerns to main component.

12.3. Bioaccumulative potential

Bioaccumulation improbable.

Because of the n-octanol/water distribution coefficient (log K o/w) accumulation in organisms is not expected.

12.4. Mobility in soil

High mobility

12.5. Results of PBT and vPvB assessment

The substances in this mixture do not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Other adverse effects

Not known.

Behaviour in sewage plant

If appropriate application no interferences in sewage treatment plants.

! General regulation

Avoid release to the environment.

! SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste code No.

16 01 14*

Name of waste

antifreeze fluids containing hazardous substances

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 2008/98/EC on hazardous waste.

! Recommendations for the product

Dispose of in accordance with the local official regulations.

Return to manufacturer.

Recommendations for packaging

Totally emptied packaging: Return to supplier / manufacturer.

SECTION 14: Transport information

	ADR/RID	IMDG	IATA-DGR
14.1. UN number	-	-	-

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	ADR/RID	IMDG	IATA-DGR
14.2. UN proper shipping name	-	-	-
14.3. Transport hazard class(es)	-	-	-
14.4. Packing group	-	-	-
14.5. Environmental hazards	-	-	-

14.6. Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

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

not applicable

No transport as bulk according IBC - Code.

Land and inland navigation transport ADR/RID

No dangerous goods as defined by these transport regulations.

Marine transport IMDG

No hazardous material as defined by the prescriptions.

Air transport ICAO/IATA-DGR

No hazardous material as defined by the prescriptions.

Transport/further information

No dangerous goods as defined by the transport regulations - ADR/RID, IMDG, ICAO/IATA-DGR.

! SECTION 15: Regulatory information

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

No information available.

15.2. Chemical Safety Assessment

Exposure scenarios (ES) see annex to this safety data sheet.

Chemical safety assessments for substances in this mixture were carried out.

! SECTION 16: Other information

Recommended uses and restrictions

National and local regulations concerning chemicals shall be observed.

® GHC Gerling, Holz & Co. Handels GmbH's registered trademark.

Further information

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

Indication of changes: "!" = Data changed compared with the previous version. Previous version: 1.1

! Sources of key data used

For the preparation of this safety data sheet, information from our suppliers as well as data from the "database of registered substances" of the European Chemicals Agency (ECHA) were used.

H302 Harmful if swallowed.

H373 May cause damage to organs (or state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).

Annex: Exposure scenarios

Exposure Scenario(s)

Number	Title
ES 1	Consumer use; End-use of chemical products, Heat transfer fluids, Hydraulic fluids PC16, PC17 – ERC9a, ERC9b Ethane-1,2-diol
ES 2	Industrial use; End-use of chemical products, Functional Fluids PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 – ERC7 Ethane-1,2-diol
ES 3	Professional use; End-use of chemical products, Functional Fluids PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9, PROC20 – ERC9a, ERC9b Ethane-1,2-diol
ES 4	Professional use; Anti-freeze and de-icing products PROC1, PROC2, PROC8a, PROC8b, PROC11 – ERC8d Ethane-1,2-diol
ES 5	Industrial use, Professional use; Laboratory use PROC15 – ERC8a Ethane-1,2-diol

1. ES 1: Consumer use; End-use of chemical products, Heat transfer fluids, Hydraulic fluids

1.1. Titles of Contributing scenarios (CS)

Heat transfer fluids (PC16)	
Hydraulic fluids (PC17)	
Environment	
CS1: Consumer use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems)	ERC9a, ERC9b
Consumer	
CS2: Consumer use (Heat transfer fluids, Hydraulic fluids)	PC16, PC17

1.2. ES 1 Conditions of use affecting exposure

1.2.1 ES 1 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems) (ERC9a, ERC9b)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
The use is assessed to be safe.

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Annex: Exposure scenarios

1.2.2 ES 1 - CS 2: Control of consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

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

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : < 15 min
Remarks : Type of activity or process, light work

Human factors not influenced by risk management

Dermal exposure : Both hands
: 960 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor
Temperature : 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

1.3. ES 1 Exposure estimation and reference to its source

1.3.2 ES 1 - CS 2: Consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	1,93 mg/m ³ (ECETOC TRA v2.0 worker; modified)	0,28

Annex: Exposure scenarios

- local and systemic	version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	0,08
Oral exposure	Not applicable	
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	0,36

1.4. ES 1 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
see section 2 of this exposure scenario.

2. ES 2: Industrial use; End-use of chemical products, Functional Fluids

2.1. Titles of Contributing scenarios (CS)

Environment	
CS1: Industrial use (Industrial use of substances in closed systems)	ERC7
Workers	
CS2: Industrial use (Use in closed process, no likelihood of exposure)	PROC1
CS3: Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC2
CS4: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4
CS5: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS6: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9

2.2. ES 2 Conditions of use affecting exposure

Annex: Exposure scenarios

2.2.1 ES 2 - CS 1: Control of environmental exposure: Industrial use (Industrial use of substances in closed systems) (ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
The use is assessed to be safe.

2.2.2 ES 2 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Exposed skin surface assumed : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Technical conditions and measures : Use in closed process, no likelihood of exposure
Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

2.2.3 ES 2 - CS 3: Control of worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Product characteristics

Concentration of the Substance in : <= 100 %

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Mixture/Article

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Note : Use in closed, continuous process with occasional controlled exposure
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

2.2.4 ES 2 - CS 4: Control of worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Exposed skin surface assumed : 240 cm²
Remarks : Use in closed batch process (synthesis or formulation)
Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²
Remarks : Use in batch and other process (synthesis) where opportunity for exposure arises

Other operational conditions affecting workers exposure

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Outdoor / Indoor : Indoor

Risk management measures

Technical conditions and measures : Use in closed batch process (synthesis or formulation)

Note : Use in batch and other process (synthesis) where opportunity for exposure arises
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

2.2.5 ES 2 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Both hands
Exposed skin surface assumed : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Exposure routes : Inhalation exposure
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 90 %
Personal protective measures : If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

2.2.6 ES 2 - CS 6: Control of worker exposure: Industrial use (Transfer of substance

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or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa
Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²
Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Outdoor / Indoor : Indoor

Risk management measures

Note : No specific measures identified.

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

2.3. ES 2 Exposure estimation and reference to its source

2.3.2 ES 2 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

2.3.3 ES 2 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

2.3.4 ES 2 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

Annex: Exposure scenarios

2.3.5 ES 2 - CS 5: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

2.3.6 ES 2 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37

Annex: Exposure scenarios

Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

2.4. ES 2 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
see section 2 of this exposure scenario.

3. ES 3: Professional use; End-use of chemical products, Functional Fluids

3.1. Titles of Contributing scenarios (CS)

Environment		
CS1:	Professional use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems)	ERC9a, ERC9b
Workers		
CS2:	Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation))	PROC1, PROC2, PROC3
CS3:	Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS5:	Professional use (Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC9
CS6:	Professional use (Heat and pressure transfer fluids in dispersive, professional use but closed systems)	PROC20

3.2. ES 3 Conditions of use affecting exposure

Annex: Exposure scenarios

3.2.1 ES 3 - CS 1: Control of environmental exposure: Professional use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems) (ERC9a, ERC9b)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
The use is assessed to be safe.

3.2.2 ES 3 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Exposed skin surface assumed : 240 cm²
Remarks : Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²
Remarks : Use in closed, continuous process with occasional controlled exposure

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Technical conditions and measures : Use in closed process, no likelihood of exposure
Sample via a closed loop or other system to avoid exposure.

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Technical conditions and measures : Use in closed, continuous process with occasional controlled exposure

Technical conditions and measures : Use in closed batch process (synthesis or formulation)
With occasional controlled exposure

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

3.2.3 ES 3 - CS 3: Control of worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

3.2.4 ES 3 - CS 4: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

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Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Both hands
Exposed skin surface assumed : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Exposure routes : Inhalation
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

3.2.5 ES 3 - CS 5: Control of worker exposure: Professional use (Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye

Annex: Exposure scenarios

irritants)

3.2.6 ES 3 - CS 6: Control of worker exposure: Professional use (Heat and pressure transfer fluids in dispersive, professional use but closed systems) (PROC20)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

3.3. ES 3 Exposure estimation and reference to its source

3.3.2 ES 3 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for	ECETOC TRA v2.0 worker; modified version, Use in	0,004

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all exposure routes)	closed process, no likelihood of exposure	
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23

3.3.3 ES 3 - CS 3: Worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,80

3.3.4 ES 3 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

3.3.5 ES 3 - CS 5: Worker exposure: Professional use (Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC9)

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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,80

3.3.6 ES 3 - CS 6: Worker exposure: Professional use (Heat and pressure transfer fluids in dispersive, professional use but closed systems) (PROC20)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,02
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,39

3.4. ES 3 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Annex: Exposure scenarios

4. ES 4: Professional use; Anti-freeze and de-icing products

4.1. Titles of Contributing scenarios (CS)

Environment	
CS1: Professional use (Wide dispersive outdoor use of processing aids in open systems)	ERC8d
Workers	
CS2: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure)	PROC1, PROC2
CS3: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS4: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	PROC8b
CS5: Professional use (Non industrial spraying)	PROC11

4.2. ES 4 Conditions of use affecting exposure

4.2.1 ES 4 – CS 1: Control of environmental exposure: Professional use (Wide dispersive outdoor use of processing aids in open systems) (ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
The use is assessed to be safe.

4.2.2 ES 4 – CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure) (PROC1, PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

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Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Exposed skin surface assumed : 240 cm²
Remarks : Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²
Remarks : Use in closed, continuous process with occasional controlled exposure

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Technical conditions and measures : Use in closed process, no likelihood of exposure
Sample via a closed loop or other system to avoid exposure.

Technical conditions and measures : Use in closed, continuous process with occasional controlled exposure

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

4.2.3 ES 4 – CS 3: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Both hands
Exposed skin surface assumed : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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Annex: Exposure scenarios

Risk management measures

Exposure routes : Inhalation
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

4.2.4 ES 4 – CS 4: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of both hands
Exposed skin surface assumed : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

4.2.5 ES 4 – CS 5: Control of worker exposure: Professional use (Non industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

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Vapour pressure : 0,123 hPa

Amount used

Amounts used : 3 l
Remarks : per hour

Frequency and duration of use

Exposure duration : 150 min
Frequency of use : <= 5 days per week

Human factors not influenced by risk management

Dermal exposure : Whole body

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Room size : <= 1000 m³

Risk management measures

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Effectiveness (of a measure) : 90 %

Personal protective measures : Wear suitable working clothes.
Wear suitable coveralls to prevent exposure to the skin.

Effectiveness (of a measure) : 80 %

Personal protective measures : Wear a half-mask respirator, selected in accordance with EN529.
Filter type:
Gas filtering device (DIN EN 141)

Effectiveness (of a measure) : 40 %

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure that spray direction is only horizontal or downward.

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure that the direction of airflow is clearly away from the worker.

Note : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure : Provide enhanced general ventilation by mechanical means.

Organisational measures to prevent /limit releases, dispersion : Regular cleaning of work area

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and exposure

Organisational measures to prevent /limit releases, dispersion and exposure : Regular cleaning of equipment

Organisational measures to prevent /limit releases, dispersion and exposure : Regular inspection and maintenance of equipment and machines

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

4.3. ES 4 Exposure estimation and reference to its source

4.3.2 ES 4 – CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38

4.3.3 ES 4 – CS 3: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

4.3.4 ES 4 – CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m ³ (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,80

4.3.5 ES 4 – CS 5: Worker exposure: Professional use (Non industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m ³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
Human health (combined for all exposure routes)	Not applicable	0,91

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

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5. ES 5: Industrial use, Professional use; Laboratory use

5.1. Titles of Contributing scenarios (CS)

Environment	
CS1: Industrial use, Professional use (Wide dispersive indoor use of processing aids in open systems)	ERC8a
Workers	
CS2: Industrial use, Professional use (Use as laboratory reagent)	PROC15

5.2. ES 5 Conditions of use affecting exposure

5.2.1 ES 5 – CS 1: Control of environmental exposure: Industrial use, Professional use (Wide dispersive indoor use of processing aids in open systems) (ERC8a)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
The use is assessed to be safe.

5.2.2 ES 5 – CS 2: Control of worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Exposed skin surface assumed : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Risk management measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear closed protection glasses., General measures (eye irritants)

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

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5.3. ES 5 Exposure estimation and reference to its source

5.3.2 ES 5 – CS 2: Worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m ³ (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

5.4. ES 5 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
see section 2 of this exposure scenario.