

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



NITRALZ® Butyronitrile

Version 6.2 / REG_EU

Revision Date: 20.08.2020

Specification: 164631

Material no.:

Date of first issue: 28.01.2010

Print Date: 30.12.2020

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

1.1 Product identifier

Trade name : NITRALZ® Butyronitrile
Registration number : 01-2119958949-10-0001
CAS-No. : 109-74-0
EC-No. : 203-700-6

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

Use of the Sub-
stance/Mixture : Organic intermediate/s, Solvent

1.3 Details of the supplier of the safety data sheet

Company : AlzChem Trostberg GmbH
Dr.-Albert-Frank-Str. 32
83308 Trostberg, Germany
Telephone : +49 8621 86-3351
E-mail address of person
responsible for the SDS : alz-pst@alzchem.com

1.4 Emergency telephone number

Emergency telephone num-
ber : +49 8621 86-2776
AlzChem Trostberg GmbH, Fire Brigade

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquids, Category 2 : H225: Highly flammable liquid and vapour.
Acute toxicity, Category 3 : H301: Toxic if swallowed.
Acute toxicity, Category 3 : H311: Toxic in contact with skin.
Acute toxicity, Category 3 : H331: Toxic if inhaled.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



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- Signal word : Danger
- Hazard statements : H225 Highly flammable liquid and vapour.
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled.
- Precautionary statements : **Prevention:**
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
- Response:**
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- Storage:**
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

2.3 Other hazards

Not a PBT, vPvB substance as per the criteria of the REACH Ordinance

|| Vapours can form explosive mixtures with air.

SECTION 3: Composition/information on ingredients

3.1 Substances

Substance name : Butyronitrile

Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
Butyronitrile	109-74-0 203-700-6	>= 99

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : Immediate medical attention is required.
Helpers must protect themselves and bring victims out of hazard area.
Remove contaminated or soaked clothing immediately and dispose of safely.
Symptoms of poisoning may appear several hours later.

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- If inhaled : Bring affected person outside and ensure that he/she is comfortable.
Monitor breathing, give oxygen if necessary.
- In case of skin contact : Wash off immediately with plenty of water.
Continue flushing with polyethylene glycol 400.
- In case of eye contact : Rinse thoroughly with plenty of water, also under the eyelids.
- If swallowed : Rinse mouth thoroughly with water.
Drink 1 or 2 glasses of water.
Do not induce vomiting without medical advice.
administration of activated charcoal.
Should vomiting occur, be sure to keep victim's head below hips to avoid aspiration of vomitus into the lungs.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : Cyanosis

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Symptoms of poisoning may not appear for several hours.
Keep under medical supervision for at least 48 hours.
Treat as cyanide poisoning.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Water spray, foam, CO₂, dry powder.
- Unsuitable extinguishing media : high volume water jet

5.2 Special hazards arising from the substance or mixture

- Hazardous combustion products : Carbon oxides
Nitrogen oxides (NO_x)
Hydrocyanic acid (HCN)

5.3 Advice for firefighters

- Special protective equipment for firefighters : In the case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit.
- Further information : Vapours are heavier than air.
Flash back possible over considerable distance.
In case of fire cool containers or take them to a safe place. To cool, spray closed containers with water spray jet.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Wear personal protective equipment; see section 8.
Ensure adequate ventilation.
Keep away from sources of ignition - No smoking.

6.2 Environmental precautions

Environmental precautions : Product or extinguishing water with product must not be allowed to enter soil, sewers or natural bodies of water.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Ventilate room thoroughly
Remove all sources of ignition.
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder).
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

|| For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : Provide sufficient ventilation and exhaust at the workplace.
If possible, use material transfer/filling, metering and blending plants that are closed.
Do not allow containers and vessels to stand open

Advice on protection against fire and explosion : Keep away from combustion sources such as sparks, flames and unprotected light sources Take precautionary measures against static discharges. Explosion protection equipment required.

Hygiene measures : Do not inhale vapours / aerosols. Contact with skin, eyes and clothes must be strictly avoided Remove contaminated or saturated clothing immediately and dispose of safely. When using, do not eat, drink or smoke. Wash face and/or hands before break and end of work. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place. Keep locked up.

Storage class (TRGS 510) : 3, Flammable liquids

7.3 Specific end use(s)

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Specific use(s) : We are unaware of any specific end uses which go beyond the data reported in Section 1.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Butyronitrile	Workers	Inhalation		0,53 mg/m ³
Remarks:	Long-term - systemic effects			
	Workers	dermal		0,14 mg/kg bw/day
Remarks:	Long-term - systemic effects			

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Butyronitrile	Freshwater	0,107 mg/l
	Fresh water sediment	0,566 mg/kg dry weight (d.w.)
	water - intermittent releases	1,07 mg/l
	STP	0,15 mg/l
	marine water	0,011 mg/l
	Marine sediment	0,0566 mg/kg dry weight (d.w.)
	Soil	0,051 mg/kg dry weight (d.w.)

8.2 Exposure controls

Personal protective equipment

Eye protection : Tightly fitting safety goggles

Hand protection

Material : Butyl-rubber, Recommendation: Butoject 898
Break through time : > 480 min
Glove thickness : 0,7 mm
Directive : DIN EN 374
Manufacturer : Kächele-Cama Latex GmbH (KCL), Germany

Skin and body protection : Flame retardant antistatic protective clothing.
If intensive contact with the hazardous material cannot be avoided with certainty, order (depending on the hazard involved) additional protective measures for example chemical protective suit.
DuPont™ Tychem® C (yellow)

Respiratory protection : Use suitable respiratory protection where aerosols/vapours are generated.
Respirator with ABEK combination filter

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	: liquid
Colour	: colourless
Odour	: bitter almond
pH	: Not applicable
Melting point/range	: -11,88 °C (1.013 hPa)
Boiling point/boiling range	: 117 - 118 °C (1.013 hPa)
Flash point	: 22 °C(1.013 hPa) Method: closed cup
Vapour pressure	: 23,11 hPa (20 °C)
Density	: 0,79 g/cm ³ (20 °C)
Solubility(ies) Water solubility	: 34,2 g/l (20 °C)
Partition coefficient: n- octanol/water	: log Pow: 0,401 (30 °C)
Auto-ignition temperature	: 458 °C (980 hPa)
Viscosity Viscosity, dynamic	: 0,55 mPa.s (25 °C)

9.2 Other information

Surface tension	: 23,7 mN/m, 21,1 °C
Molecular weight	: 69,11 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

See section 10.3

10.2 Chemical stability

No decomposition if stored and applied as directed.

10.3 Possibility of hazardous reactions

Hazardous reactions : No hazardous reactions are known if properly handled and stored.

10.4 Conditions to avoid

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Conditions to avoid : Keep away from heat and sources of ignition.

10.5 Incompatible materials

Materials to avoid : strong acids, strong bases, strong oxidant

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.
see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product:

Acute oral toxicity : Assessment: Toxic if swallowed.

Acute inhalation toxicity : Assessment: Toxic if inhaled.

Acute dermal toxicity : Assessment: Toxic in contact with skin.

Components:

Butyronitrile:

Acute oral toxicity : LD50 (rat): 350 mg/kg
Method: OECD Test Guideline 425
Assessment: Toxic if swallowed.
Remarks: IUCLID

Acute inhalation toxicity : LC50 (rat): > 1200 ppm
Exposure time: 1 h
Method: OECD Test Guideline 403
Assessment: Toxic if inhaled.
Remarks: IUCLID

Acute dermal toxicity : LD50 (rat): > 2000 mg/kg
Method: OECD Guide-line 402
Remarks: IUCLID

Acute toxicity estimate: 200 - 1000 mg/kg
Assessment: Toxic in contact with skin.
Remarks: EU-CLP as per Regulation (EU) No. 1272/2008,
Annex VI

Skin corrosion/irritation

Components:

Butyronitrile:

Species : guinea pig
Exposure time : 24 h

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Assessment : Based on available data, the classification criteria are not met.
Method : analogy OECD-method
Result : slightly irritating
Remarks : IUCLID

Serious eye damage/eye irritation

Components:

Butyronitrile:

Species : Rabbit
Exposure time : 14 d
Assessment : Based on available data, the classification criteria are not met.
Method : analogy OECD-method
Result : slightly irritating
Remarks : IUCLID

Respiratory or skin sensitisation

Components:

Butyronitrile:

Remarks : no data available

Germ cell mutagenicity

Components:

Butyronitrile:

Germ cell mutagenicity- Assessment : Based on available data, the classification criteria are not met.
Remarks: IUCLID

Carcinogenicity

Components:

Butyronitrile:

Carcinogenicity - Assessment : no data available
Remarks: IUCLID

Reproductive toxicity

Components:

Butyronitrile:

Effects on foetal development : Species: Rat
General Toxicity Maternal: NOAEL: 25 mg/kg body weight
Embryo-foetal toxicity: NOAEL: 25 mg/kg body weight

Reproductive toxicity - Assessment : Based on available data, the classification criteria are not met.
Remarks: IUCLID

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STOT - single exposure

Components:

Butyronitrile:

Assessment : Based on available data, the classification criteria are not met.
Remarks : IUCLID

STOT - repeated exposure

Components:

Butyronitrile:

Assessment : Based on available data, the classification criteria are not met.
Remarks : IUCLID

Repeated dose toxicity

Components:

Butyronitrile:

Species : Rat
NOAEL : 15 mg/kg
Exposure time : 90-day

Aspiration toxicity

Components:

Butyronitrile:

No data available

SECTION 12: Ecological information

12.1 Toxicity

Components:

Butyronitrile:

Toxicity to fish : LC50 (Pimephales promelas): > 107 mg/l
Exposure time: 96 h
Method: OECD TG 203
Remarks: IUCLID

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 110 mg/l
Exposure time: 48 h
Method: OECD TG 202
Remarks: IUCLID

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchnerella subcapitata): > 133,4 mg/l
End point: growth rate
Exposure time: 72 h

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Method: OECD 201
Remarks: IUCLID

12.2 Persistence and degradability

Components:

Butyronitrile:

Biodegradability : Biodegradation: 69 %
Exposure time: 28 d
Method: (O₂; closed bottle test / OECD 301 D)
Remarks: IUCLID

Remarks: The 10 day time window criterion is not fulfilled.
Not readily biodegradable.

12.3 Bioaccumulative potential

Components:

Butyronitrile:

Bioaccumulation : Remarks: Significant bioaccumulation need not be expected.
Partition coefficient: n-octanol/water : log Pow: 0,401 (30 °C)

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment : Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

12.6 Other adverse effects

Product:

Additional ecological information : Do not allow entrance in sewage water, soil or stretches of water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Must be brought to an adequate waste treatment facility, in conformity with applicable waste disposal regulations.
Contaminated packaging : Packaging, that can not be reused after cleaning must be disposed or recycled in accordance with all federal, national and local regulations.

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SECTION 14: Transport information

14.1 UN number

ADR : UN 2411

RID : UN 2411

IMDG : UN 2411

IATA (Cargo) : UN 2411

14.2 UN proper shipping name

ADR : BUTYRONITRILE

RID : BUTYRONITRILE

IMDG : BUTYRONITRILE

IATA (Cargo) : Butyronitrile

14.3 Transport hazard class(es)

ADR : 3

RID : 3

IMDG : 3

IATA (Cargo) : 3

14.4 Packing group

ADR

Packing group : II

Classification Code : FT1

Hazard Identification Number : 336

Labels : 3 (6.1)

Tunnel restriction code : (D/E)

RID

Packing group : II

Classification Code : FT1

Hazard Identification Number : 336

Labels : 3 (6.1)

IMDG

Packing group : II

Labels : 3 (6.1)

EmS Code : F-E, S-D

Remarks : Clear of living quarters.

IATA (Cargo)

Packing instruction (cargo aircraft) : 364

Packing instruction (LQ) : Y341

Packing group : II

Labels : Flammable Liquids, Toxic

Remarks : ERG-Code 3L

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IATA (Passenger)

Packing instruction (passenger aircraft) : 352
Packing instruction (LQ) : Y341
Packing group : II
Labels : Flammable Liquids, Toxic
Remarks : ERG-Code 3L

14.5 Environmental hazards

ADR

Environmentally hazardous : no

RID

Environmentally hazardous : no

IMDG

Marine pollutant : no

14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

15.2 Chemical safety assessment

A substance safety assessment was carried out for this product.

SECTION 16: Other information

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - In-

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ternational Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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Annex: Exposure Scenarios

Table of Contents

Number	Title
ES 1	Worker (industrial) - Formulation and Re-Packing
ES 2	Worker (industrial) - Use as solvent
ES 3	Worker (industrial) - Use as an Intermediate

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ES 1: Worker (industrial) - Formulation and Re-Packing

1.1. Title section

Structured Short Title	: Worker (industrial) - Formulation and Re-Packing
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Environment		
CS 1	Worker (industrial) - Formulation and Re-Packing	ERC2
Worker		
CS 2	Worker (industrial) - Formulation and Re-Packing	PROC1
CS 3	Worker (industrial) - Formulation and Re-Packing	PROC2
CS 4	Worker (industrial) - Formulation and Re-Packing	PROC3
CS 5	Worker (industrial) - Formulation and Re-Packing	PROC4
CS 6	Worker (industrial) - Formulation and Re-Packing	PROC5
CS 7	Worker (industrial) - Formulation and Re-Packing	PROC8a
CS 8	Worker (industrial) - Formulation and Re-Packing	PROC8b
CS 9	Worker (industrial) - Formulation and Re-Packing	PROC9
CS 10	Worker (industrial) - Formulation and Re-Packing	PROC15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Annual amount per site	: 150000 kg 100 %
Daily amount per site	: 7500 kg
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18000 m ³ /d
Indoor or outdoor use	: Indoor use

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1.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 8 h
Conditions and measures related to personal protection, hygiene and health evaluation	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

1.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

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Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

Temperature : Assumes use at not more than 20°C above ambient temperature.

Ventilation rate per hour : 3

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

1.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product : Liquid, vapour pressure 0,5 - 10 kPa at STP

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : duration of activity < 1 h

Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

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Temperature	:	Assumes use at not more than 20°C above ambient temperature.
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Ventilation rate per hour	:	3
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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

1.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0,5 - 10 kPa at STP
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Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	duration of activity < 0,15 h
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Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed	:	<= 240 cm ²
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Indoor or outdoor use	:	Indoor use.
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Temperature	:	Assumes use at not more than 20°C above ambient temperature.
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Ventilation rate per hour	:	10
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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

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1.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics
Covers concentrations up to 100 %
Physical form of product : Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : duration of activity < 0,15 h
Technical and organisational conditions and measures
Local exhaust ventilation Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %
Wear a respirator conforming to EN140. Dermal - minimum efficiency of 90 %
Use suitable eye protection.
For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Body parts exposed : <= 240 cm ²
Indoor or outdoor use : Indoor use.
Temperature : Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour : 10
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Occupational Health and Safety Management System: Advanced

1.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics
Covers concentrations up to 1 %

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Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

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

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 0,15 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

Temperature : Assumes use at not more than 20°C above ambient temperature.

Ventilation rate per hour : 3

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

1.2.9. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product : Liquid, vapour pressure 0,5 - 10 kPa at STP

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : duration of activity < 0,15 h

Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Wear a respirator conforming to EN140.
Inhalation - minimum efficiency of 90 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

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Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

1.2.10. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 0,15 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3

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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Additional information on exposure estimation

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

1.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,029 mg/m ³ (ECETOC TRA worker v3)	0,05
inhalative	systemic	short-term	0,115 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,03 mg/kg bw/day (ECETOC TRA worker v3)	0,24
combined routes	systemic	long-term		0,29

1.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,288 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,014 mg/kg bw/day (ECETOC TRA worker v3)	0,09
combined routes	systemic	long-term		0,64

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1.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,403 mg/m ³ (ECETOC TRA worker v3)	0,76
inhalative	systemic	short-term	8,062 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,007 mg/kg bw/day (ECETOC TRA worker v3)	0,05
combined routes	systemic	long-term		0,81

1.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,173 mg/m ³ (ECETOC TRA worker v3)	0,33
inhalative	systemic	short-term	6,91 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	0,24
combined routes	systemic	long-term		0,57

1.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,043 mg/m ³ (ECETOC TRA worker v3)	0,08
inhalative	systemic	short-term	1,73 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,49

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combined routes	systemic	long-term		0,57
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1.3.7. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,288 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,014 mg/kg bw/day (ECETOC TRA worker v3)	0,09
combined routes	systemic	long-term		0,64

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,25 mg/m ³ (ECETOC TRA worker v3)	0,48
inhalative	systemic	short-term	10,08 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,49
combined routes	systemic	long-term		0,96

1.3.9. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,14 mg/m ³ (ECETOC TRA worker v3)	0,27
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA	

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			worker v3)	
dermal	systemic	long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	0,25
combined routes	systemic	long-term		0,52

1.3.10. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,288 ppm (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	11,52 (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,002 mg/kg bw/day (ECETOC TRA worker v3)	0,01
combined routes	systemic	long-term		0,55

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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ES 2: Worker (industrial) - Use as solvent

2.1. Title section

Structured Short Title	: Worker (industrial) - Use as solvent
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Environment		
CS 1	Worker (industrial) - Use as solvent	ERC4
Worker		
CS 2	Worker (industrial) - Use as solvent	PROC1
CS 3	Worker (industrial) - Use as solvent	PROC2
CS 4	Worker (industrial) - Use as solvent	PROC3
CS 5	Worker (industrial) - Use as solvent	PROC4
CS 6	Worker (industrial) - Use as solvent	PROC8a
CS 7	Worker (industrial) - Use as solvent	PROC8b
CS 8	Worker (industrial) - Use as solvent	PROC15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Amount used (or contained in articles), frequency and duration of use/exposure	
Annual amount per site	: 150000 kg 100 %
Daily amount per site	: 7500 kg
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18000 m ³ /d
Indoor or outdoor use	: Indoor use

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2.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 8 h
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

2.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

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Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

Temperature : Assumes use at not more than 20°C above ambient temperature.

Ventilation rate per hour : 3

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

2.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product : Liquid, vapour pressure 0,5 - 10 kPa at STP

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : duration of activity < 0,15 h

Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

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Temperature	:	Assumes use at not more than 20°C above ambient temperature.
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Ventilation rate per hour	:	3
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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

2.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0,5 - 10 kPa at STP
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Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	duration of activity < 0,15 h
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Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed	:	<= 240 cm ²
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Indoor or outdoor use	:	Indoor use.
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Temperature	:	Assumes use at not more than 20°C above ambient temperature.
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Ventilation rate per hour	:	10
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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

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2.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics	
Covers concentrations up to 1 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

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

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP

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Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 0,15 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

2.2.8. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

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Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

For further specification, refer to section 8 of the SDS.

Use suitable eye protection.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

Temperature : Assumes use at not more than 20°C above ambient temperature.

Ventilation rate per hour : 3

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Additional information on exposure estimation

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

2.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,03 mg/m ³ (ECETOC TRA worker v3)	0,05
inhalative	systemic	short-term	0,12 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,03 mg/kg bw/day (ECETOC TRA worker v3)	0,24
combined routes	systemic	long-term		0,30

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2.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,29 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,01 mg/kg bw/day (ECETOC TRA worker v3)	0,09
combined routes	systemic	long-term		0,64

2.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,29 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	11,52 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,004 mg/kg bw/day (ECETOC TRA worker v3)	0,025
combined routes	systemic	long-term		0,57

2.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,17 mg/m ³ (ECETOC TRA worker v3)	0,33
inhalative	systemic	short-term	6,91 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,07 mg/kg bw/day (ECETOC TRA worker v3)	0,49

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combined routes	systemic	long-term		0,82
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2.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,29 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,014 mg/kg bw/day (ECETOC TRA worker v3)	0,09
combined routes	systemic	long-term		0,64

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,25 mg/m ³ (ECETOC TRA worker v3)	0,47
inhalative	systemic	short-term	10,08 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,49
combined routes	systemic	long-term		0,97

2.3.8. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,40 mg/m ³ (ECETOC TRA worker v3)	0,76
inhalative	systemic	short-term	8,06 mg/m ³ (ECETOC TRA worker v3)	

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dermal	systemic	long-term	0,003 mg/kg bw/day (ECETOC TRA worker v3)	0,02
combined routes	systemic	long-term		0,78

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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ES 3: Worker (industrial) - Use as an Intermediate

3.1. Title section

Structured Short Title	: Worker (industrial) - Use as an Intermediate
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Environment		
CS 1	Worker (industrial) - Use as an Intermediate	ERC6a
Worker		
CS 2	Worker (industrial) - Use as an Intermediate	PROC1
CS 3	Worker (industrial) - Use as an Intermediate	PROC2
CS 4	Worker (industrial) - Use as an Intermediate	PROC3
CS 5	Worker (industrial) - Use as an Intermediate	PROC4
CS 6	Worker (industrial) - Use as an Intermediate	PROC8a
CS 7	Worker (industrial) - Use as an Intermediate	PROC8b
CS 8	Worker (industrial) - Use as an Intermediate	PROC15

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Annual amount per site	: 150000 kg 100 %
Daily amount per site	: 7500 kg
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18000 m ³ /d
Indoor or outdoor use	: Indoor use

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3.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 8 h
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

3.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

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Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

Temperature : Assumes use at not more than 20°C above ambient temperature.

Ventilation rate per hour : 3

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product : Liquid, vapour pressure 0,5 - 10 kPa at STP

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : duration of activity < 1 h

Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

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Temperature	:	Assumes use at not more than 20°C above ambient temperature.
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Ventilation rate per hour	:	3
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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

3.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics

Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0,5 - 10 kPa at STP
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Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	duration of activity < 0,15 h
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Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed	:	<= 240 cm ²
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Indoor or outdoor use	:	Indoor use.
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Temperature	:	Assumes use at not more than 20°C above ambient temperature.
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Ventilation rate per hour	:	10
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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

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3.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics	
Covers concentrations up to 1 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 1 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

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

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP

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Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 0,15 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Body parts exposed	: <= 240 cm ²
Indoor or outdoor use	: Indoor use.
Temperature	: Assumes use at not more than 20°C above ambient temperature.
Ventilation rate per hour	: 3
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

3.2.8. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers concentrations up to 100 %	
Physical form of product	: Liquid, vapour pressure 0,5 - 10 kPa at STP
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 0,15 h
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

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Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 95 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Body parts exposed : <= 240 cm²

Indoor or outdoor use : Indoor use.

Temperature : Assumes use at not more than 20°C above ambient temperature.

Ventilation rate per hour : 3

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a)

Additional information on exposure estimation

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

3.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,03 mg/m ³ (ECETOC TRA worker v3)	0,05
inhalative	systemic	short-term	0,12 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,03 mg/kg bw/day (ECETOC TRA worker v3)	0,24
combined routes	systemic	long-term		0,30

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3.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,29 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,014 mg/kg bw/day (ECETOC TRA worker v3)	0,09
combined routes	systemic	long-term		0,64

3.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,40 mg/m ³ (ECETOC TRA worker v3)	0,76
inhalative	systemic	short-term	8,06 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,007 mg/kg bw/day (ECETOC TRA worker v3)	0,05
combined routes	systemic	long-term		0,81

3.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,17 mg/m ³ (ECETOC TRA worker v3)	0,33
inhalative	systemic	short-term	6,91 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,03 mg/kg bw/day (ECETOC TRA worker v3)	0,25

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combined routes	systemic	long-term		0,57
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3.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,288 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	5,76 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,014 mg/kg bw/day (ECETOC TRA worker v3)	0,09
combined routes	systemic	long-term		0,64

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,25 mg/m ³ (ECETOC TRA worker v3)	0,48
inhalative	systemic	short-term	10,08 mg/m ³ (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,49
combined routes	systemic	long-term		0,97

3.3.8. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,29 mg/m ³ (ECETOC TRA worker v3)	0,54
inhalative	systemic	short-term	11,25 mg/m ³ (ECETOC TRA worker v3)	

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dermal	systemic	long-term	0,002 mg/kg bw/day (ECETOC TRA worker v3)	0,01
combined routes	systemic	long-term		0,55

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.