

Safety Data Sheet



LiCl

Lithium Chloride Solution

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

1.1. Product identifier

Trade name	Lithium Chloride Solution
Contains	Lithium Chloride

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

Relevant identified uses	SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites SU24: Scientific research and development
Uses advised against	Do NOT use for private purposes (household).

1.3. Details of the supplier of the safety data sheet

Manufacturer/Supplier	LevertonHELM Ltd
Address	Unit 13-15 Sherrington Way Lister Road Industrial Estate RG22 4DQ, UK
Telephone number	+44 (0) 1256 810393
E-mail	+44 (0) 1256 479324
E-mail address of competent person responsible for the SDS	sales@levertonhelm.com
Only representative	CS Regulatory (Ireland) Ltd, Alexandra House, The Sweepstakes, Ballsbridge, Dublin, D04 C7H2, Ireland
National Contact	

1.4. Emergency telephone number

Telephone number	+44(0) 333 333 9946
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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)

Acute Tox. 4	H302	Harmful if swallowed.
Skin Irrit. 2	H315	Causes skin irritation.
Eye Irrit. 2	H319	Causes serious eye irritation.

Additional information

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

2.2. Label elements

Hazard pictogram(s)



Signal word

Warning

Hazard statement(s)

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Precautionary statement(s)

P264: Wash hands thoroughly after handling.

P280: Wear protective gloves, protective clothing, eye protection and face protection.

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

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P501 : Dispose of contents / container in accordance with local / regional / national / international regulations.

Supplemental information on the label

Supplementary Hazard Information (EU)

None

Hazard Determining Component(s)

Lithium Chloride

2.3. Other hazards

PBT and vPvB assessment is not applicable to inorganic substances. Lithium chloride does not cause endocrine disruption.

SECTION 3: Composition/information on ingredients**3.2. Mixtures**

Chemical Name	Identification Number CAS No. / EC No. / Index No.	REACH Registration Number	% [weight]	Classification in accordance with Regulation (EC) No 1272/2008 (CLP)	SCL / M-factor / ATE / Particle Characteristics
Lithium Chloride	7447-41-8 / 231-212-3 /-	EU-01-2119560574-35-0003; UK-01-4451936628-8-0001	40	Acute Tox. 4 H302 Eye Irrit. 2 H319 Skin Irrit. 2 H315	-

For full text of H-statements, see SECTION 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General notes	If symptoms persist, seek medical attention.
Following inhalation	Remove person to fresh air and keep comfortable for breathing. Keep at rest. If experiencing respiratory symptoms: Get immediate medical advice/attention.
Following skin contact	Wash thoroughly with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
Following eye contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists seek medical advice/attention.
Following ingestion	Rinse mouth with water. Never give anything by mouth to an unconscious person. Call a doctor if you feel unwell.
Self-protection of the first aider	If it is suspected that the mixture is still present, wear appropriate personal protective equipment.

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

Harmful if swallowed. Causes skin irritation. Causes serious eye irritation.

Symptoms:

Following inhalation: May irritate the respiratory tract and mucous membrane.

Following skin contact: May cause redness or irritation.

Following eye contact: Causes serious eye irritation.

Following ingestion: Harmful if swallowed.

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

Treat systematically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Use fire-extinguishing media suitable for the surrounding fire.
Unsuitable extinguishing media	None

5.2. Special hazards arising from the substance or mixture

Combustion or thermal decomposition will evolve toxic and irritant vapours.

Hazardous combustion products Hydrogen Chloride. Lithium oxides.

5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus (SCBA) approved for firefighting.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Persons not wearing personal protective clothing should be restricted from the spillage area.

For emergency responders

Wear suitable protective clothing, gloves and eye/face protection. Persons not wearing personal protective clothing should be restricted from the spillage area.

6.2. Environmental precautions

Do not allow to enter drains, sewers or watercourses. Ensure waste is collected and contained.

6.3. Methods and material for containment and cleaning up

Contain and absorb spillage with sand, earth or other non-combustible material. Collect and place in suitable waste disposal containers and seal securely.

Large spillages: Contain spillage with sand, earth or other suitable non-combustible material. Large spills should be pumped into containers pending disposal. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Washings must be prevented from entering surface water drains. Contact LevertonHELM for advice regarding recycling or waste disposal.

6.4. Reference to other sections

For Personal Protective Equipment, see Section 8. For disposal, see Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Wear suitable personal protective equipment. See Section 8. Avoid contact with skin, eyes or clothing.

Wash hands thoroughly after handling. Wash hands before breaks and at the end of workday. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a cool, well-ventilated place. Keep only in the original container. Keep container tightly closed. Keep containers upright.

Keep away from strong acids. Keep away from food, drink, and animal feeding stuffs.

7.3. Specific end use(s)

No further relevant information available.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters**

No Occupational Exposure Limit assigned.

Derived No Effect Level (DNEL) - Lithium Chloride anhydrous

Workers

Inhalation, Chronic effects systemic	10	mg/m ³
Dermal, Chronic effects systemic	73.2	mg/kg bw/day

Consumers

Inhalation, Chronic effects systemic	10	mg/m ³
Dermal, Chronic effects systemic	73.2	mg/kg bw/day
Dermal, Acute effects systemic	50	mg/kg bw/day
Oral, Chronic effects systemic	7.32	mg/kg bw/day

Predicted No Effect Concentration (PNEC) - Lithium Chloride anhydrous

Fresh water	10.4 mg/L
Marine water	1.04 mg/L
Intermittent releases (freshwater)	10.4 mg/L
Freshwater sediments	270 mg/kg sediment dw
Marine water sediments	27 mg/kg sediment dw
Microorganisms in sewage treatment (STP)	140.2 mg/L
Soil	49.95 mg/kg soil dw

8.2. Exposure controls

Appropriate engineering controls

Use engineering controls (e.g. local exhaust ventilation) and supply personal protective equipment.

Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

Eye/face protection



Goggles or safety glasses with side shields giving complete protection to eyes according to EN 166:2001. If larger quantities are being used in a manufacturing/ repacking process then a full face visor should be worn.

Skin protection

Hand protection



Protective gloves conforming to EN374.

Recommended gloves: Nitrile Rubber. Neoprene.
PVC. Natural Rubber.

Other

Laboratory coat or other chemical resistant protective clothing.

Respiratory protection



No specific respiratory equipment required. Care should be taken to avoid exposure to splashes/droplets.

Thermal hazards

Not applicable.

Environmental exposure controls

Avoid release to the environment.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

(a) Physical state	Liquid.
(b) Colour	Colourless.
(c) Odour	Odourless
Odour Threshold	Not applicable.
(d) Melting point/freezing point	Not applicable.
(e) Boiling point or initial boiling point and boiling range	Not determined.
(f) Flammability	Not flammable.
(g) Lower and upper explosion limit	Not applicable.
(h) Flash point	Not applicable.
(i) Auto-ignition temperature	Not applicable.
(j) Decomposition temperature	1383 °C (LiCl)
(k) pH	c. 6 (10% aqueous solution)
(l) Kinematic viscosity	Not determined.
(m) Solubility	Soluble.
(n) Partition coefficient n-octanol/water (log value)	Not applicable.
(o) Vapour pressure	Not applicable.
(p) Density and/or relative density	2.1 g/cm ³ @ 20 °C (LiCl, Literature information)
(q) Relative vapour density	Not applicable.
(r) Particle characteristics	Not applicable.

Product name: Lithium Chloride Solution

SDS reference 08bSDS06

9.2. Other information

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Information with regard to physical hazard classes

Not classified.

Explosive Properties

Not explosive.

Oxidising Properties

Not oxidising.

Other safety characteristics

Evaporation rate

Not determined.

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal storage and temperature conditions.

10.2. Chemical stability

Stable under normal storage and temperature conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Contact with acids.

10.5. Incompatible materials

Strong Acids.

10.6. Hazardous decomposition products

Thermal decomposition products: Lithium oxides. Hydrogen Chloride.

SECTION 11: Toxicological information**11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008**

(a) acute toxicity

acute toxicity - oral

Lithium Chloride
LD50 (oral) (rat) 526 mg/kg bw (Literature information).
Lithium Chloride 40% solution ATE: 1315 mg/kg bw
Acute Tox. 4 H302: Harmful if swallowed.

acute toxicity - dermal

Lithium Chloride
LD50 (dermal) (rat) > 2000 mg/kg bw
EU B.3/OECD Guideline 402
Not classified, based on the available data the
classification criteria are not met.

acute toxicity - inhalation

Lithium Chloride
LC50 > 5.57 mg/L (4h) (rat)
OECD Guideline 403
Not classified, based on the available data the
classification criteria are not met.

(b) skin corrosion/irritation

Non-irritant (Rabbit)
Irritant (human experience)
Skin Irrit. 2 H315: Causes skin irritation.

(c) serious eye damage/irritation

Irritant (Rabbit)
Eye Irrit. 2: Causes serious eye irritation.

(d) respiratory or skin sensitisation

respiratory sensitisation

Not classified, based on the available data the
classification criteria are not met.

skin sensitisation

Non sensitising (Guinea Pig)
OECD Guideline 406/EU B.6/EPA OPP 81-6
Not classified, based on the available data the
classification criteria are not met.

(e) germ cell mutagenicity

Not classified, based on the available data the
classification criteria are not met.

(f) carcinogenicity

Not classified, based on the available data the
classification criteria are not met.

(g) reproductive toxicity

Not classified, based on the available data the
classification criteria are not met.

(h) STOT-single exposure

Not classified, based on the available data the
classification criteria are not met.

(i) STOT-repeated exposure

Lithium Chloride
NOAEL: 7.32 mg/kg bw/day (human)
Not classified, based on the available data the
classification criteria are not met.

(j) aspiration hazard Not classified. Data lacking.

Information on likely routes of exposure

Ingestion Harmful if swallowed.

Skin Causes skin irritation. May cause redness or irritation

Eyes Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics

Irritating to the eyes and skin. May be irritating to the mucous membranes. Harmful if swallowed.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

None known.

11.2 Information on other hazards

Endocrine disrupting properties

Lithium chloride does not cause endocrine disruption.

Other information

No other information.

SECTION 12: Ecological information**12.1. Toxicity**

Not classified, based on the available data the classification criteria are not met.

Data on aquatic toxicity

Acute (short-term) toxicity - Lithium Chloride

Fish	LC50, 96h (Oncorhynchus mykiss) 158 mg/L OECD guideline 203
Crustaceans	EC50, 48h (daphnia magna) 249 mg/L OECD guideline 202
Algae and other aquatic plants	EC50, 72h (Desmodesmus subspicatus) > 400 mg/L NOEC, 72 h (Desmodesmus subspicatus) 25 mg/L OECD guideline 201
Microorganisms	Activated sludge EC50 3h 320.05 mg/L EC10 3h 1402.2 mg/L OECD Guideline 209

Chronic (long-term) toxicity

Fish

NOEC 34 days 18 mg/L (read across)

Crustaceans

NOEC 21 days 10.4 mg/L (read across)

12.2. Persistence and degradability

Not relevant for inorganic substances.

12.3. Bioaccumulative potential

The substance has low potential for bioaccumulation.

12.4. Mobility in soil

Low potential for adsorption.

Lithium Chloride quickly dissociates in water forming lithium and chloride ions.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment is not applicable to inorganic substances.

12.6. Endocrine disrupting properties

Lithium Chloride does not cause endocrine disruption.

12.7. Other adverse effects

None

SECTION 13: Disposal considerations

13.1. Waste treatment methods

LevertonHELM is licensed to dispose of these preparations by recycling and also to waste. Contact LevertonHELM for details.

Suitable methods:

Dispose of contents / container in accordance with local / regional / national / international regulations
Seek the advice of an approved waste disposal contractor for disposal at a licensed facility in accordance with national legislation.

Dispose of this material and its container to hazardous or special waste collection point.

SECTION 14: Transport information

Not classified as dangerous for transport under ADR, IATA or IMDG

14.1. UN number or ID number

None

Product name: Lithium Chloride Solution
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14.2. UN proper shipping name

Not applicable

14.3. Transport hazard class(es)

Not applicable

14.4. Packing group

Not applicable

14.5. Environmental hazards

Not applicable

14.6. Special precautions for user

Not applicable

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

UK Regulations

The substance is classified and labelled according to the CLP Regulation as amended by GB CLP.

This safety data sheet is prepared in accordance with Annex II to Regulation (EC) No 1907/2006 as amended by UK REACH.

EU Regulations

The substance is classified and labelled according to the CLP Regulation.

This safety data sheet is prepared in accordance with Annex II to Regulation (EC) No 1907/2006 as amended by Regulation (EU) No. 2020/878.

Authorisations and/or restrictions on use

Authorisations

Lithium Chloride is not on the REACH Candidate list.

Lithium chloride is not listed in Annex XIV of REACH.

Restrictions on use

No restrictions according to REACH Annex XVII.

National regulations

Germany

Wassergefährdungsklasse (water hazard class): Not on the list.

TechnischeAnleitungLuft (TA-Luft)

Chapter 5.2.1 Total dust, including fine dust

15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

SECTION 16: Other information**i) Indication of changes**

SDS-Reference	08bSDS06
Version number	6
Revision: (date)	12/12/2022
Previous Version	08bSDS05
Reason for revision	Updated to Regulation EU No. 2020/878. Updates to sections: 1, 2, 3, 4, 8, 9, 11, 12 & 15.

ii) Abbreviations and acronyms

DNEL	Derived no-effect level
EC50	The effective concentration of substance that causes 50% of the maximum response.
NOEC	No observed effect concentration
NOAEL	No observed adverse effect level
LD50	Lethal dose 50%
LC50	Median lethal concentration
PBT	Persistent, bioaccumulative and toxic
PNEC	Predicted no-effect concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Regulation (EC) No 1907/2006)
vPvB	very persistent and very bioaccumulative

iii) Key literature references and sources for data

ECHA REACH Dossier
GESTIS ILV (limitvalue.ifa.dguv.de)
Regulation (EC) No. 1272/2008 (CLP)
Regulation (EC) No. 1907/2006 (REACH)
Commission Regulation (EU) No. 2020/878
Endocrine Disruptor Lists (edlists.org/the-ed-lists)

iv) Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]

Classification according to Regulation (EC) No. 1272/2008	Classification procedure
Acute Tox. 4 H302	Calculation Method
Skin Irrit. 2 H315	Calculation Method
Eye Irrit. 2 H319	Calculation Method

v) Relevant H-statements (number and full text)

Acute Tox. 4 H302	Acute Toxicity, category 4. Harmful if swallowed.
Skin Irrit. 2 H315	Skin corrosion/irritation Category 2. Causes skin irritation.
Eye Irrit. 2 H319	Serious eye damage/eye irritation Category 2. Causes serious eye irritation.

vi) Training advice

Read SDS and supplier instructions on correct use of the product. Workers should be trained to handle hazardous chemicals. It is recommended that they are familiar with the contents of this safety data sheet.

vii) Further information

No other information

DISCLAIMER

The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable. This safety data sheet is not a risk assessment. Recipients are advised to make their own risk assessment as required by other Health and Safety legislations.

1. ES 1: Manufacture**1.1. Manufacture**

ES name: Manufacture of lithium chloride

Environment	
CS 1: Manufacture of lithium chloride	ERC 1
Worker	
CS 2: Use in closed process, no likelihood of exposure	PROC 1
CS 3: Use in closed, continuous process with occasional controlled exposure	PROC 2
CS 4: Use in closed batch process (synthesis or formulation)	PROC 3
CS 5: Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
CS 6: Mixing or blending in batch processes for formulation of preparations and articles	PROC 5
CS 7: Transfer of substance or preparation (charging/discharging) from/to vessels/large	PROC 8a
CS 8: Transfer of substance or preparation (charging/discharging) from/to vessels/large	PROC 8b
CS 9: Transfer of substance or preparation into small containers (dedicated filling line,	PROC 9
CS 10: Use as laboratory reagent	PROC 15

1.2. Conditions of use affecting exposure**1.2.1. Control of environmental exposure: Manufacture of lithium chloride (ERC 1)**

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed
Assumed domestic sewage treatment plant flow ≥ 2000 m ³ /day
Other conditions affecting environmental exposure
Receiving surface water flow ≥ 18000 m ³ /day

1.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed process without likelihood of exposure or processes with
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed continuous process with occasional controlled exposure or
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure

Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use

Assumes process temperature up to 40.0 °C

1.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.7. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>

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

Wear suitable eye protection; For further specification, refer to section 8 of the SDS.

Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Indoor use

Assumes process temperature up to 40.0 °C

1.2.8. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)**Product (Article) characteristics**

Covers concentrations up to 100.0 %

Covers non or low-dusty materials

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

Covers use up to 8.0 h/day

Technical and organisational conditions and measures

Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

*Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %***Conditions and measures related to personal protection, hygiene and health evaluation**

Wear suitable eye protection; For further specification, refer to section 8 of the SDS.

Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Indoor use

Assumes process temperature up to 40.0 °C

1.2.9. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.10. Control of worker exposure: Use as laboratory reagent (PROC 15)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a basic standard of general ventilation (1 to 3 air changes per hour)

Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Manufacture of lithium chloride (ERC 1)

Release route	Release rate	Release estimation
Water	27 kg/day	ERC based
Air	22.5 kg/day	ERC based
Soil	0.045 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES)	RCR
Fresh water	1.351 mg/L	0.13
Sediment (freshwater)	5.291 mg/kg dw	0.106
Marine water	0.135 mg/L	0.13
Sediment (marine water)	0.529 mg/kg dw	0.106
Sewage Treatment Plant	13.49 mg/L	0.096
Agricultural soil	0.024 mg/kg dw	< 0.01
Man via environment - Inhalation	3.43E-3 mg/m ³	< 0.01
Man via environment - Oral	0.542 mg/kg bw/day	0.074

Protection target	Exposure estimate (based on: EUSES)	RCR
Man via environment - combined routes		0.074

1.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	4E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.022

1.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.041

1.3.7. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.041

1.3.8. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.5E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.014 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.038

1.3.9. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.028 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.019

1.3.10. Worker exposure: Use as laboratory reagent (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

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

Each exposure scenario (ES) was generated using the ECHA Chesar tool. Estimated exposures are not expected to exceed the DNELs or PNECs when the risk management measures detailed in each exposure scenario are adopted.

If conditions differ significantly from those listed above, the downstream user (DU) should check whether they are still within the boundaries

of the ES. Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Framework for exposure assessment and Part E: Risk Characterisation; ECHA Practical guide 13: How downstream users can handle exposure scenarios; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain.

2. ES 2: Formulation or re-packing; various products**2.1. Formulation**

ES name: Formulation

Environment	
CS 1: Formulation	ERC 2
Worker	
CS 2: Use in closed process, no likelihood of exposure	PROC 1
CS 3: Use in closed, continuous process with occasional controlled exposure	PROC 2
CS 4: Use in closed batch process (synthesis or formulation)	PROC 3
CS 5: Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
CS 6: Mixing or blending in batch processes for formulation of preparations and articles	PROC 5
CS 7: Transfer of substance or preparation (charging/discharging) from/to vessels/large	PROC 8a
CS 8: Transfer of substance or preparation (charging/discharging) from/to vessels/large	PROC 8b
CS 9: Transfer of substance or preparation into small containers (dedicated filling line,	PROC 9
CS 10: Use as laboratory reagent	PROC 15

2.2. Conditions of use affecting exposure**2.2.1. Control of environmental exposure: Formulation (ERC 2)**

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed
Assumed domestic sewage treatment plant flow ≥ 2000 m ³ /day
Other conditions affecting environmental exposure
Receiving surface water flow ≥ 18000 m ³ /day

2.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Product (Article) characteristics

Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed process without likelihood of exposure or processes with
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed continuous process with occasional controlled exposure
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes process temperature up to 40.0 °C

2.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Manufacture or formulation in the chemical industry in closed batch processes with occasional
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure

Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Assumes process temperature up to 40.0 °C

2.2.7. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.8. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.9. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.10. Control of worker exposure: Use as laboratory reagent (PROC 15)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Formulation (ERC 2)

Release route	Release rate	Release estimation method
Water	100 kg/day	ERC based
Air	125 kg/day	ERC based
Soil	0.5 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES)	RCR
Fresh water	5 mg/L	0.481
Sediment (freshwater)	19.58 mg/kg dw	0.392

Protection target	Exposure estimate (based on: EUSES)	RCR
Marine water	0.5 mg/L	0.481
Sediment (marine water)	1.958 mg/kg dw	0.392
Sewage Treatment Plant	49.98 mg/L	0.357
Agricultural soil	0.079 mg/kg dw	0.019
Man via environment -	9.52E-4 mg/m ³	< 0.01
Man via environment - Oral	0.155 mg/kg bw/day	0.021
Man via environment -		0.021

2.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	1E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	4E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.022

2.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.041

2.3.7. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
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Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.041

2.3.8. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.5E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.014 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.038

2.3.9. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.028 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.019

2.3.10. Worker exposure: Use as laboratory reagent (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

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

Each exposure scenario (ES) was generated using the ECHA Chesar tool. Estimated exposures are not expected to exceed the DNELs or PNECs when the risk management measures detailed in each exposure scenario are adopted.

If conditions differ significantly from those listed above, the downstream user (DU) should check whether they are still within the boundaries of the ES. Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Framework for exposure assessment and Part E: Risk Characterisation; ECHA Practical guide 13: How downstream users can handle exposure scenarios; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain.

3. ES 3: Use at industrial sites**3.1. Use as an intermediate**

ES name: Use as an intermediate to manufacture other chemicals

Environment	
CS 1: Use as an intermediate to manufacture other chemicals	ERC 6a
Worker	
CS 2: Use in closed process, no likelihood of exposure	PROC 1
CS 3: Use in closed, continuous process with occasional controlled exposure	PROC 2
CS 4: Use in closed batch process (synthesis or formulation)	PROC 3
CS 5: Use in batch and other process (synthesis) where opportunity for	PROC 4
CS 6: Transfer of substance or preparation (charging/discharging) from/to	PROC 8b
CS 7: Transfer of substance or preparation into small containers (dedicated	PROC 9

3.2. Conditions of use affecting exposure**3.2.1. Control of environmental exposure: Use as an intermediate to manufacture other chemicals (ERC 6a)**

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed
Assumed domestic sewage treatment plant flow ≥ 2000 m ³ /day
Other conditions affecting environmental exposure
Receiving surface water flow ≥ 18000 m ³ /day

3.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed process without likelihood of exposure or processes with
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

3.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed continuous process with occasional controlled exposure
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.

Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

3.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed; Ensure
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

3.2.6. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.

Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Indoor use

Assumes process temperature up to 40.0 °C

3.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)**Product (Article) characteristics**

Covers concentrations up to 100.0 %

Covers non or low-dusty materials

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

Covers use up to 8.0 h/day

Technical and organisational conditions and measures

Supervision in place to check that the RMMs in place are being used correctly and OCs followed;

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %

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

Wear suitable eye protection; For further specification, refer to section 8 of the SDS.

Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure

Indoor use

Assumes process temperature up to 40.0 °C

3.3. Exposure estimation and reference to its source**3.3.1. Environmental release and exposure: Use as an intermediate to manufacture other chemicals (ERC 6a)**

Release route	Release rate	Release estimation method
Water	120 kg/day	ERC based
Air	300 kg/day	ERC based
Soil	6 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	5.999 mg/L	0.577
Sediment (freshwater)	23.49 mg/kg dw	0.471
Marine water	0.6 mg/L	0.577
Sediment (marine water)	2.349 mg/kg dw	0.471
Sewage Treatment Plant	59.98 mg/L	0.428
Agricultural soil	0.098 mg/kg dw	0.024
Man via environment -	4.57E-3 mg/m ³	< 0.01
Man via environment -	0.706 mg/kg bw/day	0.096
Man via environment -		0.097

3.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	1E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	4E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC 3)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.022

3.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of	Exposure estimate	RCR
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Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	3.5E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.014 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.038

3.3.7. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	7E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.028 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.019

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

Each exposure scenario (ES) was generated using the ECHA Chesar tool. Estimated exposures are not expected to exceed the DNELs or PNECs when the risk management measures detailed in each exposure scenario are adopted.

If conditions differ significantly from those listed above, the downstream user (DU) should check whether they are still within the boundaries of the ES. Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Framework for exposure assessment and Part E: Risk Characterisation; ECHA Practical guide 13: How downstream users can handle exposure scenarios; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain.

4. ES 4: Use at industrial sites

4.1. Industrial use of processing aids in processes and products, not becoming part of articles

ES name: Industrial use of processing aids in processes and products, not becoming part of articles

Environment	
CS 1: Industrial use of processing aids in processes and products, not becoming part	ERC 5
Worker	
CS 2: Use in closed process, no likelihood of exposure	PROC 1
CS 3: Use in closed, continuous process with occasional controlled exposure	PROC 2
CS 4: Use in batch and other process (synthesis) where opportunity for exposure	PROC 4
CS 5: Industrial spraying	PROC 7
CS 6: Transfer of substance or preparation (charging/discharging) from/to	PROC 8b
CS 7: Transfer of substance or preparation into small containers (dedicated filling	PROC 9
CS 8: Roller application or brushing	PROC 10
CS 9: Treatment of articles by dipping and pouring	PROC 13
CS 10: Production of preparations or articles by tableting, compression, extrusion,	PROC 14
CS 11: Low energy manipulation of substances bound in materials and/or articles	PROC 21
CS 12: Potentially closed processing operations with minerals/metals at elevated	PROC 22
CS 13: Other hot work operations with metals	PROC 25

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC 5)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed
Assumed domestic sewage treatment plant flow ≥ 2000 m ³ /day

Other conditions affecting environmental exposureReceiving surface water flow ≥ 18000 m³/day**4.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC 1)**

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Chemical production or refinery in closed process without likelihood of exposure or processes
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day

Technical and organisational conditions and measures
Chemical production or refinery in closed continuous process with occasional controlled
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.4. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.

Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.5. Control of worker exposure: Industrial spraying (PROC 7)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

**4.2.6. Control of worker exposure: Transfer of substance or preparation (charging/discharging)
from/to vessels/large containers at dedicated facilities (PROC 8b)**

Product (Article) characteristics
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Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

**4.2.7. Control of worker exposure: Transfer of substance or preparation into small containers
(dedicated filling line, including weighing) (PROC 9)**

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.8. Control of worker exposure: Roller application or brushing (PROC 10)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Assumes process temperature up to 40.0 °C

4.2.9. Control of worker exposure: Treatment of articles by dipping and pouring (PROC 13)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.10. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC 14)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures

Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.11. Control of worker exposure: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes process temperature up to 40.0 °C

4.2.12. Control of worker exposure: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting (PROC 22)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.2.13. Control of worker exposure: Other hot work operations with metals (PROC 25)

Product (Article) characteristics
Covers concentrations up to 100.0 %

Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Supervision in place to check that the RMMs in place are being used correctly and OCs followed;
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC 5)

Release route	Release rate	Release estimation method
Water	112.5 kg/day	ERC based
Air	112.5 kg/day	ERC based
Soil	2.25 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES)	RCR
Fresh water	5.624 mg/L	0.541

Protection target	Exposure estimate (based on: EUSES)	RCR
Sediment (freshwater)	22.03 mg/kg dw	0.441
Marine water	0.562 mg/L	0.541
Sediment (marine water)	2.203 mg/kg dw	0.441
Sewage Treatment Plant	56.23 mg/L	0.401
Agricultural soil	0.101 mg/kg dw	0.024
Man via environment -	0.017 mg/m ³	< 0.01
Man via environment - Oral	2.691 mg/kg bw/day	0.368
Man via environment -		0.369

4.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC 1)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

4.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC 2)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	1E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.022

4.3.4. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01

4.3.5. Worker exposure: Industrial spraying (PROC 7)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	3.5E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.014 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	8.572 mg/kg bw/day (TRA Workers 3.0)	0.117
Combined, systemic, long term		0.118

4.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	3.5E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.014 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.038

4.3.7. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	7E-3 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.028 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.019
Combined, systemic, long term		0.019

4.3.8. Worker exposure: Roller application or brushing (PROC 10)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.035 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.14 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	5.486 mg/kg bw/day (TRA Workers 3.0)	0.075
Combined, systemic, long term		0.078

4.3.9. Worker exposure: Treatment of articles by dipping and pouring (PROC 13)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.038

4.3.10. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC 14)

Route of exposure and type of	Exposure estimate	RCR
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Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.01

4.3.11. Worker exposure: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m ³ (TRA Workers 3.0)	0.01
Inhalation, systemic, acute	0.4 mg/m ³ (TRA Workers 3.0)	0.013
Dermal, systemic, long term	0.566 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.018

4.3.12. Worker exposure: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting (PROC 22)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m ³ (TRA Workers 3.0)	0.01
Inhalation, systemic, acute	0.4 mg/m ³ (TRA Workers 3.0)	0.013
Dermal, systemic, long term	0.566 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.018

4.3.13. Worker exposure: Other hot work operations with metals (PROC 25)

Route of exposure and type of	Exposure estimate	RCR
Inhalation, systemic, long term	0.5 mg/m ³ (TRA Workers 3.0)	0.05
Inhalation, systemic, acute	2 mg/m ³ (TRA Workers 3.0)	0.067
Dermal, systemic, long term	0.056 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.051

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

Each exposure scenario (ES) was generated using the ECHA Chesar tool. Estimated exposures are not expected to exceed the DNELs or PNECs when the risk management measures detailed in each exposure scenario are adopted.

If conditions differ significantly from those listed above, the downstream user (DU) should check whether they are still within the boundaries of the ES. Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Framework for exposure assessment and Part E: Risk Characterisation; ECHA Practical guide 13: How downstream users can handle exposure scenarios; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain.

5. ES 5: Widespread use by professional workers; Various products

5.1. Professional use of lithium chloride

ES name: Professional use of lithium chloride

Environment	
CS 1: Professional use of lithium chloride	ERC 8a
CS 2: Professional use of lithium chloride	ERC 8b
Worker	
CS 3: Transfer of substance or preparation (charging/discharging)	PROC 8a
CS 4: Transfer of substance or preparation (charging/discharging)	PROC 8b
CS 5: Roller application or brushing	PROC 10
CS 6: Non industrial spraying	PROC 11
CS 7: Treatment of articles by dipping and pouring	PROC 13
CS 8: Use as laboratory reagent	PROC 15

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Professional use of lithium chloride (ERC 8a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed

5.2.2. Control of environmental exposure: Professional use of lithium chloride (ERC 8b)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed

5.2.3. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 80.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

5.2.4. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure

Product name: Lithium Chloride Solution	SDS reference 08bSDS06
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Covers use up to 8.0 h/day	Page 63 of 69
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour)	
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 80.0 %</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to	
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.	
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to 40.0 °C	

5.2.5. Control of worker exposure: Roller application or brushing (PROC 10)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 80.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

5.2.6. Control of worker exposure: Non industrial spraying (PROC 11)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 80.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

5.2.7. Control of worker exposure: Treatment of articles by dipping and pouring (PROC 13)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 80.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation

Product name: Lithium Chloride Solution	SDS reference 08bSDS06
Date: 22/11/2023	SDS Number: 06
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.	
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to 40.0 °C	

5.2.8. Control of worker exposure: Use as laboratory reagent (PROC 15)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Covers non or low-dusty materials
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour)
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 80.0 %</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable eye protection; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Professional use of lithium chloride (ERC 8a)

Release route	Release rate	Release estimation method
Water	2.75E-3 kg/day	ERC based
Air	- kg/day	ERC based
Soil	- kg/day	ERC based

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Protection target	Exposure estimate (based on: EUSES)	RCR
Fresh water	1.78E-3 mg/L	< 0.01
Sediment (freshwater)	6.99E-3 mg/kg dw	< 0.01
Marine water	1.74E-4 mg/L	< 0.01
Sediment (marine water)	6.82E-4 mg/kg dw	< 0.01
Sewage Treatment Plant	1.37E-3 mg/L	< 0.01
Agricultural soil	4.85E-4 mg/kg dw	< 0.01
Man via environment -	1.73E-14 mg/m ³	< 0.01
Man via environment - Oral	1.16E-4 mg/kg bw/day	< 0.01
Man via environment -		< 0.01

5.3.2. Environmental release and exposure: Professional use of lithium chloride (ERC 8b)

Release route	Release rate	Release estimation method
Water	5.5E-5 kg/day	ERC based
Air	- kg/day	ERC based
Soil	- kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES)	RCR
Fresh water	1.65E-3 mg/L	< 0.01
Sediment (freshwater)	6.46E-3 mg/kg dw	< 0.01
Marine water	1.61E-4 mg/L	< 0.01
Sediment (marine water)	6.3E-4 mg/kg dw	< 0.01
Sewage Treatment Plant	2.75E-5 mg/L	< 0.01
Agricultural soil	4.83E-4 mg/kg dw	< 0.01
Man via environment - Inhalation	1.73E-14 mg/m ³	< 0.01
Man via environment - Oral	1.15E-4 mg/kg bw/day	< 0.01
Man via environment - combined		< 0.01

5.3.3. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.037
Combined, systemic, long term		0.038

5.3.4. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.04 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers	0.037
Combined, systemic, long term		0.038

5.3.5. Worker exposure: Roller application or brushing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m ³ (TRA Workers 3.0)	0.01
Inhalation, systemic, acute	0.4 mg/m ³ (TRA Workers 3.0)	0.013
Dermal, systemic, long term	5.486 mg/kg bw/day (TRA Workers	0.075
Combined, systemic, long term		0.085

5.3.6. Worker exposure: Non industrial spraying (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.02 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.08 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	21.43 mg/kg bw/day (TRA Workers	0.293
Combined, systemic, long term		0.295

5.3.7. Worker exposure: Treatment of articles by dipping and pouring (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m ³ (TRA Workers 3.0)	0.01
Inhalation, systemic, acute	0.4 mg/m ³ (TRA Workers 3.0)	0.013
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers	0.037
Combined, systemic, long term		0.047

5.3.8. Worker exposure: Use as laboratory reagent (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.02 mg/m ³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.08 mg/m ³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers	< 0.01
Combined, systemic, long term		< 0.01

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

Each exposure scenario (ES) was generated using the ECHA Chesar tool. Estimated exposures are not expected to exceed the DNELs or PNECs when the risk management measures detailed in each exposure scenario are adopted.

If conditions differ significantly from those listed above, the downstream user (DU) should check whether they are still within the boundaries of the ES. Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Framework for exposure assessment and Part E: Risk Characterisation; ECHA Practical guide 13: How downstream users can handle exposure scenarios; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain.