

Safety Data Sheet



LiCl

Lithium Chloride Anhydrous

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier:

Lithium Chloride

1.1.1 Reach Registration Number:

01-2119560574-35-0003

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

SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites.

SU24 Scientific research and development.

Do not use for private purposes (household)

1.3 Details of the supplier of the safety data sheet: Leverton-Clarke Ltd:

Unit 13-15 Sherrington Way

Lister Road Industrial Estate

Basingstoke, Hants

RG22 4DQ, England

1.4 Emergency telephone number:

+44(0) 333 333 9946

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

2.1.1 CLP Classification:

Acute Tox.4

H302 Harmful if swallowed

Skin Irrit. 2

H315 Causes skin irritation

Eye Irrit. 2

H319 Causes serious eye irritation

2.2 Label elements:

2.2.1 Label elements-CLP Classification

2.2.1.1 Hazard Pictogram(s):



2.2.1.2 Signal word:

Warning

2.2.1.3 Hazard Statements:

- H302 Harmful if swallowed
- H315 Causes skin irritation
- H319 Causes serious eye irritation

2.2.1.4 Precautionary Statements:

- P264 Wash Hands thoroughly after handling
- P280 Wear protective gloves/protective clothing/eye protection/face protection
- P302+P352 IF ON SKIN: Wash with soap and water
- P305+P351+P338 IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing
- P501 Dispose of contents/container according to local regulations

2.3 Other hazard information

Human health hazards:

Inhalation: May cause irritation to the respiratory system.

Skin contact: May irritate the skin, causing rashes after prolonged exposure.

Eye contact: Causes irritation. May cause permanent damage if not washed promptly.

Ingestion: May cause irritation to the mouth and throat. Ingestion of large quantities may cause drowsiness, weakness, tremors, anorexia, nausea, and blurred vision and muscle spasms.

SECTION 3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.2 Mixtures

Chemical Name	CAS No	EC No	% w/w	Classification According to EC No. 1272 / 2008
Lithium Chloride Anhydrous	7447-41-8	231-212-3	c.100	Acute Tox. 4 H302 Skin Irrit. 2 H315 Eye Irrit. 2 H319

For full text of Hazard Codes and H statements see Section 16

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

Eyes: Irrigate thoroughly with water or saline solution for at least 10 minutes. Obtain immediate medical attention if discomfort persists.

Skin: Wash thoroughly with water. Wash contaminated clothing before re-use. Any rashes should be washed with soap and warm water. Rashes normally clear up within a couple of hours of being washed.

If rashes persist then obtain medical advice.

Ingestion: Wash out mouth thoroughly with water. Give plenty of water to drink. Obtain immediate medical attention.

Inhalation: Remove casualty to fresh air. Allow casualty to regain normal breathing pattern.

Wash out mouth with water if necessary. If discomfort persists then obtain medical advice.

Apply artificial respiration if the casualty is not breathing and seek immediate medical attention.

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

Acute effects are irritation of the skin or mucous membranes.

This manifests itself on the skin as red itchy patches which have been in contact with the substance.

The presence of this substance in the eyes will cause redness and stinging to the person(s) affected.

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

Removal of the substance from the affected area followed by washing from the skin with soap and water or flushing of the eyes with approved saline solution.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media:

Any suitable for fire in surrounding area

5.2 Special hazards arising from the substance or mixture:

In the case of decomposition (@1382°C) Hydrogen Chloride and Lithium Oxide may be present.

- 5.3 Special protective actions for fire-fighters:
Wear full protective clothing and self-contained breathing apparatus approved for fire fighting.
Do not breathe smoke, gases or vapours generated.

SECTION 6. ACCIDENTAL RELEASE OF MATERIAL

- 6.1 Personal precautions, protective equipment and emergency procedures:
Wear gloves and safety glasses or face shield. Persons not wearing personal protective clothing should be restricted from the spillage area.
- 6.2 Environmental precautions:
Seal inlets to sewers or water courses and seek to contain spillage.
Water used for final wash down of the spillage site should be contained and collected for disposal (see section 13).
- 6.3 Methods and material for containment and cleaning up:
Use sand, earth or any suitable non-combustible adsorbent material to adsorb spillages. Collect spillage and place in a drum for disposal (see section 13).
- 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:
When handling, wear personal protective equipment (section 8). Avoid contact with skin, eyes or clothing. Wash thoroughly after handling. Eating, drinking and smoking should not be permitted in areas where this substance is handled.
- 7.2 Conditions for safe storage, including any incompatibilities:
Store in a cool dry, covered, bunded and secure area. Containers should be protected from physical damage. Keep container closed. Store away from strong acids.
- 7.3 Specific end uses:

No further relevant information available.

SECTION 8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters:

There is no specific Workplace Exposure Limit (WEL) for this substance under UK legislation.

Derived No Effect Level (DNEL) – Workers

Route of Exposure	Acute effects local	Acute effects systemic	Chronic effects local	Chronic effects systemic
Inhalation	-	30 mg/m	-	10 mg/m ³
Dermal	-	-	-	73.2 mg/kg bw/day

Derived No Effect Level (DNEL) – General Population

Route of Exposure	Acute effects local	Acute effects systemic	Chronic effects local	Chronic effects systemic
Inhalation	-	10 mg/m ³	-	30 mg/m ³
Dermal	-	50 mg/kg bw/day	-	73.2 mg/kg bw/day
Oral		21.96 mg/kg bw/day		7.32 mg/kg bw/day

Predicted No Effect Concentration (PNEC)

Environmental protection target	PNEC
Fresh water	10.4 mg/l
Freshwater sediments	49.9 mg/kg sediment dw
Marine water	1.04 mg/l
Marine water sediments	4.99 mg/kg sediment dw
STP	140.2 mg/L
Soil	4.13g/kg soil dw

8.2 Exposure controls

Engineering controls:

Use engineering controls (e.g. local exhaust ventilation) and supply personal protective equipment. Provide eye wash and safety shower.

Personal protective equipment (PPE):

Eye/Face: When using small quantities (grams) in a laboratory approved safety goggles should be adequate. If larger quantities are being used in a manufacturing/ repacking process then a full face visor should be worn.

Respiratory: If dry powder is handled, use Class P respirator approved for protection against inorganic dusts.

Protective clothing: Laboratory coat or other cotton/polyester overalls fully covering the body and limbs should be used when handling small quantities in a laboratory or manufacturing/ repacking process.

Disposable vinyl gloves should be the minimum protection used when handling small quantities in a laboratory. When handling larger quantities in a manufacturing/ repacking process, vinyl gloves should be worn underneath nitrile rubber gloves that provide protection to both the hands and lower arms.

8.3 Environmental exposure controls

Avoid release to the environment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	White Crystalline Powder
Odour:	None
Odour threshold:	Not applicable
pH:	c.6 at 10%w/w aqueous solution
Melting point:	Not applicable
Boiling Point:	Not applicable
Flash Point:	Not applicable
Evaporation rate:	Not determined
Flammability:	Not flammable
Flammable limits:	Not applicable
Vapour pressure:	Not determined
Relative density:	2.068 g/cm ³ (Lithium chloride solid)

Solubility in water:	45% w/w in aqueous solution at 25°C
Partition coefficient:	Not determined
Autoignition temperature:	Not determined
Decomposition temperature:	1382°C (lithium chloride solid)
Viscosity:	Not applicable
Explosive properties:	Not applicable
Oxidising properties:	Not an oxidizer

9.2 Other information: None

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity:

Not a reactive substance.

10.2 Chemical stability:

Stable if stored according to sub-section 7.2

10.3 Possibility of hazardous reaction:

No dangerous reactions known

10.4 Conditions to avoid:

Avoid contact with acids

10.5 Incompatible materials:

Strong Acids

10.6 Hazardous decomposition products:

None

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Toxicokinetics, metabolism and distribution:

Lithium chloride is a highly soluble salt that dissociates in Lithium and chloride ions in water.

After oral uptake, Lithium chloride is readily and almost completely absorbed from the

gastrointestinal tract. The absorption of Lithium through the skin is considered to be very poor

to negligible. Upon inhalation, resorption and bioavailability of Lithium carbonate is expected to be low. After absorption, Lithium is quickly distributed and unchanged excreted.

Bioaccumulation can be excluded. Chloride occurs ubiquitous and is an essential element of the human body. Thus, in the sum, the toxicological relevance of Lithium chloride is also regarded as very low.

Acute toxicity: (Values for Lithium Chloride)

LD50 (Oral, rat): 526mg/kg BW

LD50 (Dermal, rat): > 2000mg/kg bw

LC50 (Inhalation, rat): >5 .57mg/L air (4h)

Classification:

Acute Tox. 4 (oral): Harmful if swallowed.

Acute Tox. 4 (dermal): Not classified. Based on available data, the classification criteria are not met.

Acute Tox. 4 (inhalation): Not classified. Based on available data, the classification criteria are not met.

Skin corrosion/irritation:

Although the animal data would not require classification with regard to skin irritation, based on experiences with lithium chloride in humans at production sites, the substance is classified as skin irritant, category 2.

Serious eye damage/irritation:

Eye Irritant, category 2. Causes serious eye irritation.

Respiratory or skin sensitisation:

Lithium chloride was found non-sensitizing when topically applied to guinea pigs in a study according to OECD 406 and EU method B.6.

Germ cell mutagenicity:

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

Reproductive toxicity:

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

STOT-Single exposure:

No relevant effects have been observed after single exposure to the substance.

Based on available date, the classification criteria are not met.

STOT-repeated exposure:

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

Human information:

In humans, Lithium has been used in psychiatric therapy for the treatment of bipolar disorder for decades. In case of long-term treatment, the recommended dose is 450 to 900 mg/day Lithium carbonate (equivalent to 84 to 169 mg Lithium / day), corresponding to a therapeutic serum concentration of 0.5 to 1.0 mmol Lithium/L. Based on the experience with long-term application of e.g. Lithium carbonate for therapy reasons in humans, there is no evidence that Lithium is of concern with respect to repeated oral toxicity at medical doses.

The systemic doses are equivalent to 1.53 mg Lithium chloride/ kg bw/day and 3.05 Lithium chloride/ kg bw/day. The systemic NOAEL of 3.05 Lithium chloride/ kg bw/day was chosen as worst case NOAEL oral.

SECTION 12. ECOLOGICAL INFORMATION**12.1 Toxicity:**

48 hour EC50 (daphnia magna) 249 mg/l

96 hour LC50 (rainbow trout) 158 mg/l.

96hour LC50 (fathead minnow) 42mg/l.

12.2 Persistence and degradability:

Lithium chloride is not biodegraded or photodegraded.

12.3 Bioaccumulative potential:

Lithium chloride is not bio accumulated.

12.4 Mobility in soil:

Lithium chloride is water soluble and exists as inorganic ions of lithium and chloride.

12.5 Results of PBT and vPvB assessment:

PBT assessment does not apply as lithium chloride is an inorganic salt.

12.6 Other adverse effects:

No further relevant information available at present

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

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

Suitable methods:

Dispose of waste according to local regulations.

Packaging must be thoroughly rinsed with water before disposal or recycling. Wash water should be disposed of as above. Containers, even when cleaned, are considered to be a controlled waste and the duty of care still applies.

SECTION 14. TRANSPORT INFORMATION

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

14.1 UN Number: Not applicable

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 Transport in bulk according to Annex II of MARPOL73/78 and the IBC code:
Not applicable

SECTION 15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:
The substance is classified and labelled according to the CLP Regulation.

15.2 Chemical Safety Assessment:

A chemical safety assessment has been carried out for lithium chloride.

SECTION 16. OTHER INFORMATION

i) Indication of changes:

Version 2 issued 02/01/2018. Major review.

ii) Abbreviations and acronyms

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road.
CLP	Classification, Labelling and Packaging
DNEL	Derived No-Effect Level
EC50	The effective concentration of substance that causes 50% of the maximum response.
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
PNEC	Predicted No Effect Concentration
PBT	Persistent, bioaccumulative and toxic
vPvB	very persistent and very bioaccumulative

iii) Key literature and sources of data

ECHA Registration Dossier
 Regulation (EC) No. 1272/2008
 Regulation (EC) No. 1907/2006
 Regulation (EU) No. 2015/830

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

Calculation: Calculation method

v) Hazard statements (number and full text):

Acute Tox. 4 H302	Acute Toxicity, oral, category 4. Harmful if swallowed.
Eye Irrit. 2 H319	Eye Irritant, category 2. Causes serious eye irritation.

Skin Irrit. 2 H315

Skin Irritant, category 2. Causes skin irritation.

vi) Training advice:

Workers should be trained to handle hazardous chemicals. It is recommended that they are familiar with the contents of this safety data sheet.

vii) Additional information

No further information available.

DISCLAIMER

The information presented in this safety data sheet is to the best of our knowledge true and accurate, but all data, instructions and/or suggestions are made without guarantee. These statements are solely for the above mentioned product. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For these and other reasons, we do not assume any responsibility and expressly disclaim liability for loss, damage, or expense that may be incurred or is in any way connected with the handling, storage, use or disposal of the product. 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 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 18000 m3/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)
<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

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)
<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

1.3. 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
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	< 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
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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

Route of exposure and type of effects	Exposure estimate	RCR
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

Route of exposure and type of effects	Exposure estimate	RCR
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 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 18000 m3/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
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
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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	0.034 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

Route of exposure and type of	Exposure estimate	RCR
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
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
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; Ensure control measures are regularly inspected and maintained.
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; Ensure control measures are regularly inspected and maintained.
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

3.3. 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
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 m3/day
Other conditions affecting environmental exposure

Receiving 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 followed; Ensure control measures are regularly inspected and maintained.
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 followed; Ensure control measures are regularly inspected and maintained.
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 section 8 of the SDS.
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
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 followed; Ensure control measures are regularly inspected and maintained.
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 followed; Ensure control measures are regularly inspected and maintained.
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
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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 followed; Ensure control measures are regularly inspected and maintained.
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; Ensure control measures are regularly inspected and maintained.
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; Ensure control measures are regularly inspected and maintained.
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; Ensure control measures are regularly inspected and maintained.
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; Ensure control measures are regularly inspected and maintained.
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
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

Protection target	Exposure estimate (based on: EUSES)	RCR
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
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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
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 section 8 of the SDS.
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
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

5.2.5. 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 section 8 of the SDS.
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
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

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

Protection target	Exposure estimate (based on: EUSES)	RCR
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

Route of exposure and type of effects	Exposure estimate	RCR
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.