

MATERIAL SAFETY DATA SHEET

(according to Regulation (EC) No 1907/2006 of the European Parliament as amended by Regulation No 830/2015/EU)

Date of issue: 15 January 2004

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Date of revision: 6 October 2017

Previous date: 20 July 2016

Version: 5.1

Product name:

ZINC CHLORIDE ANHYDROUS

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

1.1 Product identifier

Trade name: **Zinc chloride anhydrous**
Index number: 030-003-00-2
Registration number: 01-2119472431-44-0004
Molecular formula: Cl_2Zn

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

Intended or recommended use of the substance (mixture): For industrial use.
Flux agents for casting, Intermediates, other: component in batteries, Plating agents and metal surface treating agents, Laboratory chemicals, Process regulators, other than polymerisation or vulcanisation processes, Anti-freezing agents, Fertilisers, Surface active agents.

Uses advised against: There are no uses advised against.

1.3 Details of the supplier of the safety data sheet

Name of supplier: BOCHEMIE a.s.
Address: Lidická 326, 735 81 Bohumín, Czech Republic
Company ID: 293 96 824
Phone number: +420 596 091 111
e-mail: bochemie@bochemie.cz
e-mail of person responsible for the Safety Data Sheet: MSDS@bochemie.cz

1.4 Emergency telephone number

Toxikologické informační středisko, Na Bojišti 1, 128 08 Praha 2, Czech Republic: +420 224 91 92 93 or +420 224 91 54 02.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification acc.to Reg. 1272/2008 (EC):	Acute Tox. 4, H302; Skin Corr. 1B, H314; STOT SE 3, H335; Aquatic Acute 1, H400; Aquatic Chronic 1, H410
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For the full wording of standard sentences and shortcut see section 16.

The most important adverse physicochemical, human health and environmental effects: Causes severe skin burns and eye damage. May cause respiratory irritation. Very toxic to aquatic life due to bioaccumulation of heavy metal - zinc.

2.2 Label elements

Hazard pictograms:



Signal word: Danger

Hazard statements:

H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements:

P260 Do not breathe dust.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

EXPOSURE SCENARIOS

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

Continue rinsing.

P391 Collect spillage.

P501 Dispose of contents/container by specialized competent company.

2.3 Other hazards

The substance does not meet the PBT/vPvB criteria according to REACH, annex XIII.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

3.1.1 Main constituent

Hazardous components	Percentage w/w (%)	CAS	EC	Index No.
Zinc chloride anhydrous	> 99	7646-85-7	231-592-0	030-003-00-2

3.1.2 Impurity, stabilising additive, or individual constituent

Impurities	Percentage w/w (%)
unknown impurities like Pb, Fe, Cd, Cu, K, Ca, Na	0.5
oxychlorides	< 0.1

3.2 Mixtures

Not relevant.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible).

Inhalation: shut off source of exposure, if possible. Bring the victim to the fresh air; keep at rest (avoid even walking) if necessary, seek medical attention. Oxygen or artificial respiration if needed.

Skin contact: take off contaminated clothing and shoes. Wash thoroughly with water and soap. Seek medical attention. In case of extensive burns, hospitalise.

Eye contact: flush immediately with large amounts of fresh water at least 10 minutes; seek medical attention.

Ingestion: rinse mouth with potable water and leave victim to drink 0.2-0.5 L of water if the subject is conscious. Do not induce vomiting, seek medical aid.

4.2 Most important symptoms and effects, both acute and delayed

Corrosive and irritant effect on skin and eyes are predominant. It can be appear breathing difficulties, cough, nausea, vomiting, diarrhea. The symptoms of poisoning may be occur after several hours, requires medical supervision min. 48 hrs after the accident.

4.3 Indication of any immediate medical attention and special treatment needed

In case of eyes contact, ingestion and in the development of burns ensure medical aid.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable: in case of fire nearby, water spray. Media according to the character of the fire.

Unsuitable: do not use water – risk of release to the sewers and environment.

5.2 Special hazards arising from the substance or mixture

In case of fire the product releases corrosive gas (e.g. hydrogen chloride).

5.3 Advice for fire fighters

In case fires wear an overall, a suitable respiratory system protection.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

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6.1.1 For non-emergency personnel

Wear suitable personal protective equipment. Avoid contact with skin and eyes. Do not use the substance in the closed area. Provide sufficient ventilation.

6.1.2 For emergency responders

Wear suitable personal protective equipment. Avoid contact with skin and eyes. In case of accidental discharge into sewers or water courses, dilute the product with sufficient amount of water act according to local regulations and emergency plans and notify local authorities. Provide sufficient ventilation.

6.2 Environmental precautions

Avoid release to the sewers, water courses, soil or environment. In case of accidental discharge of large amount of the concentrated product to the surface water, ground water or waste water, notify local authorities according to local regulations (e.g. fire brigade, police, rescue police, water course administrator).

6.3 Methods and material for containment and cleaning up

Wear suitable personal protective equipment. Avoid contact with skin and eyes. In case spill the product, use suitable absorbents (special absorbents for aggressive materials or universal absorbents a soda, a lime, a ground limestone) and put into the labelled lockable container. Avoid accidental discharge into sewers or water courses. Disposal by neutralisation, stabilisation and solidification process.

6.4 Reference to other sections

See section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid release to the environment. Ensure adequate ventilation. Avoid causing dust. Store in vented, closed, clean and dry location, avoid direct sunlight and other weather conditions. Store separately from fresh water, food, drink and feed.

7.2 Conditions for safe storage, including any incompatibilities

Store in original containers. Store in vented, closed, clean and dry location, avoid direct sunlight and other weather conditions. Keep away from food, drink, fresh water and feed. Provide impermeable floor. Common metals should never be used for the storage and handling.

7.3 Specific and use(s)

Important information is provided by Exposure scenarios, by instructions on the label or on the company web pages (www.bochemie.cz).

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Exposure limits values

In accordance Regulation of Government No. 361/2007 of Czech Act Collection in last wording:

Country	Substance	PEL (mg/m ³)	NPK-P (mg/m ³)
Czech Republic	Zinc chloride as Zn	1	2

8.1.2 Information on monitoring procedures

Exposure limit values and/or biological limit values according to national legislation.

8.1.3 Air monitoring procedures

Exposure limit values for air pollution according to national legislation.

8.1.4 DNEL and PNEC values

DNELs

Long-term exposure	systemic effect	worker	inhalation	1 mg/m ³
			dermal	8.3 mg/kg bw/day
	consumer		inhalation	1.25 mg/m ³
			dermal	8.3 mg/kg bw/day
			oral	0.83 mg/kg bw/day

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PNECs derived for the zinc ion

Freshwater	20.6* µg/L
Saltwater	6.1* µg/L
STP	100 µg/L
Freshwater sediment	117.8* mg/kg sediment d.w.
Saltwater sediment	56.5* mg/kg sediment d.w.
Soil	35.6* mg/kg soil d.w.

*added value; ref.CSR

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Technical conditions and measures at process level (source) to prevent release

- Process enclosures closed circuits or semi-enclosures where appropriate.
- Local exhaust ventilation on furnaces and other work areas with potential dust and fumes generation, dust capturing and removal techniques (high efficiency 90-95%)
- Careful use of chlorhydric acid and corrosive chloride solutions
- Containment of liquid volumes in sumps to collect/prevent accidental spillage

Technical conditions and measures to control dispersion from source towards the worker

Local exhaust ventilation systems (generic LEC (84%) as worst case; higher efficiencies (90-95%) are usual
Cyclones/filters (for minimizing dust emissions) : efficiency: 70-90% (cyclones), 50-80% (dust filters), 85-95% (double stage, cassette filters)

Dust control: Zn in dust needs to be measured in the workplace air (static or individual) according to national regulations.

Special care for the general establishment and maintenance of a clean working environment by e.g.:

- Cleaning of process equipment and workshop
- Storage of packaged Zn finished product in dedicated zones

Organisational measures to prevent /limit releases, dispersion and exposure

In general integrated management systems are implemented at the workplace e.g. ISO 9000/9001, ISO-ICS 13100, or alike, and are, when appropriate, IPPC-compliant.

Such management system would include general industrial hygiene practice e.g.:

- Information and training of personnel on prevention of exposure/accidents,
- Procedures for control of personal exposure (hygiene measures)
- Regular cleaning of equipment and floors, extended workers instruction-manuals
- Procedures for process control and maintenance...
- Personal protection measures (see below)

8.2.2 Individual protection measures, such as personal protective equipment

Eye/face protection: safety glasses (face shield)

Skin protection: protective clothing is compulsory (efficiency \geq 90%)

Hand protection: gloves is compulsory (efficiency \geq 90%)

Respiratory protection: with normal handling, no respiratory personal protection (breathing apparatus) is necessary. If risk for exceedance of OEL/DNEL, use full or half mask P1-P3.

8.2.3 Environmental exposure controls

Technical conditions and measures at process level (source) to prevent release

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- Local exhaust ventilation on furnaces and other work areas with potential dust and fumes generation, dust capturing and removal techniques (high efficiency 90-95%)
- Careful use of chlorhydric acid and corrosive chloride solutions
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- Regular cleaning of equipment and floors, extended workers instruction-manuals
- Procedures for process control and maintenance
- Personal protection measures

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance (at 20°C; 101.3 kPa):	solid powder
Colour:	white
Odour:	odourless
Odour threshold	odourless
pH (1% solution at 20°C):	approx. 2.5 – 4 (solution 100 g/l)
Melting point:	in nitrogen, ZnCl ₂ starts melting at 290°C; on air = at 287°C
Freezing point:	ZnCl ₂ starts decomposition at ~400°C under nitrogen atmosphere, at ~360°C under air
Boiling point:	not relevant; the sample decomposes before boiling
Flash point:	not applicable
Evaporation rate:	not applicable
Flammability (solid, gas):	no flammable
Upper/lower flammability or explosive limits:	not applicable; to be checked and specified if needed
Vapour pressure (°C):	endpoint is not relevant
Vapour density:	not applicable
Bulk density:	1400-1700kg/m ³
Water solubility:	the solubility of Zn in ZnCl ₂ is 851 g/l
Partition coefficient: n-octanol/water:	not applicable
Auto-ignition temperature;	no auto-in flammability properties
Decomposition temperature:	not applicable
Viscosity:	viscosity decreases with liquid temperature and becomes very high at solid state
Explosive properties:	no explosiveness
Oxidising properties:	not determined
Other information:	granulometry: the D50 of ZnCl ₂ is 288µm, the D80 is 561µm

9.2 Other information

Not available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal condition of use.

10.2 Chemical stability

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Zinc chloride remains stable for at least one year, when stored protected from water and sunlight at a coolish place.

10.3 Possibility of hazardous reactions

Reaction with alkali metals, alkalis, oxidizers.

10.4 Conditions to avoid

Avoid raised temperature, moisture it is hygroscopic long-lasting direct exposure to sun.

10.5 Incompatible materials

Oxidising agents, strong acids and hydroxides.

10.6 Hazardous decomposition products

Hydrogen chloride.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

- | | |
|---------------------------------------|---|
| a) acute toxicity: | LD50 oral, rat = 1.100 – 1.260 mg/kg BW (Domingo et al, 1988) |
| b) skin corrosion/irritation: | strong irritant, corrosive (Lansdown, 1991) |
| c) serious eye damage/irritation: | strong irritant (Houle and Grant, 1973) |
| d) respiratory or skin sensitisation: | no sensitizing effects known (based on cross-reading from ZnSO ₄ : Van Huygevoort, 1991, Ikarashi et al, 1992) |
| e) germ cell mutagenicity: | no relevant genotoxic activity (CSR Zinc chloride, 2010) |
| f) carcinogenicity: | no experimental or epidemiological evidence exists to justify classification of Zn compounds for carcinogenic activity (CSR, 2010) |
| g) reproductive toxicity: | no experimental or epidemiological evidence exists to justify classification of Zn compounds for reproductive or developmental toxicity (CSR, 2010) |
| h) STOT-single exposure: | no classification for target organ toxicity (Heydon and Kagan, 1990; Gordon et al., 1992; Mueller and Seger, 1985) |
| i) STOT-repeated exposure: | no classification for specific target organ toxicity (Lam et al., 1985; Conner et al., 1988) |
| j) aspiration hazard: | mild irritation (CSR Zinc chloride, 2010) |

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

12.1.1 Acute aquatic toxicity

EC50, 48 h, daphnia	0.86 mg Zn.L ⁻¹ , pH < 7:
IC50, 72 h, algae	0.28 mg Zn.L ⁻¹ , for pH > 7-8.5
LC50, 96 h, fish	0.439 mg Zn/l (read across)
NOEC, 50 days, daphnia:	0.033mg/l
NOEC, 30 days, fish:	0.169 mg/l
Aquatic Acute: M-factor 1	
Aquatic Chronic: M-factor none	

12.2 Persistence and degradability

The criterion is not relevant for Zinc chloride as inorganic substance.

12.3 Bioaccumulative potential

Zinc and zinc compounds do not bioaccumulate or biomagnified.

12.4 Mobility in soil

A solids-water partitioning coefficient of 158.5 L.kg⁻¹ (log value 2.2) was applied for zinc in soils (CSR zinc, 2010).

12.5 Results of PBT and vPvB assessment

The substance does not meet the PBT/vPvB criteria according to REACH, annex XIII.

12.6 Other adverse effects

Not known.

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SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

a) Recommended Methods of Substance and Contaminated Packaging Disposal

According to Waste Catalogue, it is dangerous waste. Personal protective equipment should be used and provisions to be applied when handling and collecting wastes regarding protection of waste spill into environment. Waste hand over to specialized competent company. Contaminated packaging hand over to specialised company as a dangerous waste.

b) Waste Legal Regulations

Directive 2008/98/EC on waste and repealing certain Directives. European Waste Code (EWC code) according to Commission Decision (2000/532/EC).

c) Suggestion of waste classification

waste 16 03 03* inorganic wastes containing dangerous substances
Or subgroup 16 03 off-specification batches and unused products

d) Suggestion of waste container classification

Containers with residues of the mixture:

15 01 10* packaging containing residues of or contaminated by dangerous substances.

SECTION 14: TRANSPORT INFORMATION

	(ADR/RID/GGVSE)	IMDG
14.1 UN Number:	UN 2331	UN 2331
14.2 UN proper shipping name:	ZINC CHLORIDE ANHYDROUS	ZINC CHLORIDE ANHYDROUS
14.3 Transport hazard class:	8	8
14.4 Packing group:	III	III
14.5 Environmental hazards	YES	YES
14.6 Special precautions for user:	--	--
14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code:	--	--
14.8 Other information:		
Danger code (Kemler)	80	80
Limited quantities (LQ)	5 kg	5 kg

SECTION 15: REGULATORY INFORMATION

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

Legislation regulating individual issues of the environmental protection and occupational hygiene conditions.

Regulation No. 1907/2006 (REACH).

Regulation No 1272/2008/ES (CLP)

15.2 Chemical safety assessment

A Chemical Safety Assessment was carried out for the substances.

SECTION 16: OTHER INFORMATION

a) Changes during Revision of the MSDS

Version 5.1 – correction of DNEL and PNEC, adding of NOEC.

The changed sections are indicated with bold line:

b) A key or legend to abbreviations and acronyms used

Acute Tox. 4 Acute toxicity of cat. 4

Skin Corr. 1B Skin corrosion of cat. 1B

STOT SE 3 Specific Target Organ Toxicity

Aquatic Acute 1 Hazardous to the aquatic environment of cat. 1

Aquatic Chronic 1 Hazardous to the aquatic environment, long-term effects, cat. 1

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DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
PBT	Persistent, Bioaccumulative and Toxic
vPvB	Very Persistent and Very Bioaccumulative
NPK-P	Maximum Permissible Concentration
PEL	Permissible Exposure Limit
CSR	Chemical Safety Report

c) Key literature references and sources for data

- Chemical Safety Report (CSR) zinc chloride. 2010
- Conner MW, Flood WH and Rogers AE (1988). Lung injury in guinea pigs caused by multiple exposures to ultra-fine zinc oxide. Changes in pulmonary lavage fluid. J. Toxicol. Environ. Health 25, 57-69
- Dutka BJ, Nyholm N and Petersen J. 1983. Comparison of several microbiological toxicity screening tests. Water research volume 17, nr10, 1363-1368
- Gordon T, Chen LC, Fine JM, Schlesinger RB, Su WY, Kimmel TA and Amdur MO (1992). Pulmonary effects of inhaled zinc oxide in human subjects, guinea-pigs, rats, and rabbits. Am. Ind. Hyg. Assoc. J. 53, 503-509
- Heydon JL and Kagan AN (1990). Metal fume fever. N. Z. Med. J. 103, 52
- Houle RE and Grant WM (1973). Zinc chloride keratopathy and cataracts. Am. J. Ophthalmol. 75, 992-996.
- Ikarashi Y, Tsuchiya T and Nakamura A (1992). Detection of contact sensitivity of metal salts using the murine local lymph node assay. Toxicol. Lett. 62: 53-61.
- Lam HF, Conner MW, Rogers AE, Fitzgerald S and Amdur MO (1985). Functional and morphologic changes in the lungs of guinea pigs exposed to freshly generated ultra-fine zinc oxide. Toxicol. Appl. Pharmacol. 78, 29-38
- Lam HF, Chen LC, Ainsworth D, Peoples S and Amdur MO (1988). Pulmonary function of guinea pigs exposed to freshly generated ultra-fine zinc oxide with and without spike concentrations. Am. Ind. Hyg. Assoc. J. 49, 333-341
- Mueller EJ and Seger DL (1985). Metal fume fever - a review. J. Emerg. Med. 2, 271-274
- Van Huygevoort AHBM (1999 i). Assessment of contact hypersensitivity to zinc sulphate heptahydrate in the albino guinea pig (maximisation-test). Project 254328. NOTOX B.V., 's-Hertogenbosch, The Netherlands.

d) The methods of evaluating information

The substance was classified on the basis of test results and according to Regulation 1272/2008/EC.

e) List of relevant hazard statements, safety phrases and/or precautionary statements

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H335	May cause respiratory irritation
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long-lasting effects

f) Instructions for Training

Personnel handling the preparation must be instructed about manipulation risks and on requirements for health and environmental protection (relevant provisions of the Labor Code as amended) and further, they must be demonstrably familiarized with dangerous properties, occupational health and environmental protection principles and first aid measures (Czech Act No. 258/2000 Coll. on public health protection as amended).

g) Recommended Use Limitations

The substance should not be used for any other purpose than determined (see Section 1.2). As specific conditions of use of the substance are beyond control of the supplier, the user is the only responsible to adapt the information and warnings contained herein to local legislation and regulations. The safety information describes the product from perspective of its safety and it cannot be deemed technical specifications of the product.

h) List of uses for which a Generic Exposure Scenario is provided as annex

Uses are listed in table in Exposure Scenario.

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Table 1: Generic exposure scenarios (GES) for ZnCl₂

Number	Sector	Uses	Code
0	Zinc Chloride production	Manufacture Substance	GES _{ZnCl₂} 0
1	Formulation step	Formulation general	GES _{ZnCl₂} 1
2	First tier applications	Manufacturing of other zinc compounds	GES _{ZnCl₂} 2
3		Laboratory reagent	GES _{ZnCl₂} 3
4		As component for solid blends & matrices	GES _{ZnCl₂} 4
5		As component for production of dispersions, pastes and other viscous matrices	GES _{ZnCl₂} 5
6		Second tier applications	DU of ZnCl ₂ -containing solid preparations
7	DU of ZnCl ₂ -containing liquid & pasty preparations		GES _{ZnCl₂} 7

Table 1.1: Identified uses for ZnCl₂ and corresponding Generic Exposure Scenario (GES)

IU number	Identified Use (IU) name	GES code
1	Zinc chloride recovery	GESZnCl ₂ 0
2	Zinc chloride production and refining	GESZnCl ₂ 0
6	Production of inorganic zinc compounds	GESZnCl ₂ 2
7	Electro galvanising	GESZnCl ₂ 2
8	Electroplating	GESZnCl ₂ 2
9	Zinc production by electro winning	GESZnCl ₂ 2
10	Production of Zinc chloride based fluxing agents	GESZnCl ₂ 2
11	steel surface treatment prior to hot-dip galvanizing	GESZnCl ₂ 4, GESZnCl ₂ 5
12	Use of zinc chloride based fluxing agents before welding/soldering processes	GESZnCl ₂ 6, Generic consumer/environment
13	Laboratory reagent	GESZnCl ₂ 3
14	Catalytic agent	GESZnCl ₂ 2, GESZnCl ₂ 3
15	Zinc production by pyro metallurgy	GESZnCl ₂ 2
16	Production of organic zinc compounds	GESZnCl ₂ 2
17	Production of organic pigments	GESZnCl ₂ 1, GESZnCl ₂ 4
18	Production of coatings, paints, inks, enamels, varnishes	GESZnCl ₂ 1, GESZnCl ₂ 4
19	Formulation of abrasive material for tools	GESZnCl ₂ 1, GESZnCl ₂ 4
20	Component for paper coating or treatment for paper products	GESZnCl ₂ 1, GESZnCl ₂ 5
21	Use of ZnCl ₂ containing paper coatings	GESZnCl ₂ 6
22	Textile and leather coating treatment	GESZnCl ₂ 1, GESZnCl ₂ 5
23	Use of ZnCl ₂ containing coatings for textile and leather	GESZnCl ₂ 6
24	Additive in the manufacturing of electric-electronic components	GESZnCl ₂ 1, GESZnCl ₂ 4
25	Batteries /fuel cells	GESZnCl ₂ 1, GESZnCl ₂ 4, GESZnCl ₂ 5
26	Component for production of rubber, resins and related	GESZnCl ₂ 1, GESZnCl ₂ 5

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IU number	Identified Use (IU) name	GES code
	preparations	
27	Production of polymer-matrices, plastics and related preparations	GESZnCl2 1, GESZnCl2 5
28	Additive / component for the production of Sealants / Adhesives / Mastics	GESZnCl2 1, GESZnCl2 5
29	Use of ZnCl ₂ -containing Sealants / Adhesives / Mastics	GESZnCl2 7, Generic consumer/environment
30	Additive / component for the production of Lubricants / Grease / Metal working fluids	GESZnCl2 1, GESZnCl2 5
31	Use of ZnCl ₂ -containing Lubricants / Grease / Metal working fluids	GESZnCl2 7, Generic consumer/environment
32	Additive / component for the production of Polishes / wax blends	GESZnCl2 1, GESZnCl2 5
33	Use of ZnCl ₂ -containing Polishes / wax blends	GESZnCl2 7, Generic consumer/environment
34	Use of ZnCl ₂ -containing catalysts	GESZnCl2 1, GESZnCl2 5
35	Additive component for production of de-icing products	GESZnCl2 1, GESZnCl2 5
36	Use of ZnCl ₂ -containing de-icing products	GESZnCl2 7, Generic consumer/environment
37	Additive for the formulation of animal feedstuffs	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
38	Additive for the formulation of biocidal products	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
39	Additive for the formulation of cleaning products	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
40	Use of ZnCl ₂ -containing cleaning products	GESZnCl2 6, GESZnCl2 7, Generic consumer/environment
41	Additive for the formulation of fertilizers	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
42	Use of ZnCl ₂ -containing fertilizer's formulations	Generic consumer/environment
43	Additive in the formulation of cosmetics	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
44	Use of cosmetics	GESZnCl2 6, GESZnCl2 7, Generic consumer/environment
45	Additive in the formulation of pharma / veterinary products	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
46	Use of of Pharma / veterinary products	GESZnCl2 6, GESZnCl2 7, Generic consumer/environment

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Product name:

ZINC CHLORIDE

GES ZnCl₂-0: Industrial use of primary or secondary zinc bearing material in the manufacture of ZnCl₂ in several process steps, collection of the substance produced and packaging.

SU: 3, 8, 9
PROC: 2, 3, 8b, 9, 26
PC: 19, 20, 21
AC: not applicable
ERC: 1

Description of activities and processes covered in the exposure scenario:

- Reception of zinc-bearing materials, if applicable, and transfer to the reaction tank (chloride media)
- Reception of the Intermediate Zinc chloride solution in the reaction tank, if applicable
- Sequential addition of reagents for purification steps and filtration on press filter, when needed. Ventilation is adapted.
- Concentration by water evaporation, under exhaust hood.
- Pouring on a cooling belt
- Discharge and packaging of produced zinc chloride crystals. Workers have to place and adjust the bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area.
- Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m³ capacity); solids are packed in bags or drums.
- Maintenance activities

Contributing scenario (1) controlling environmental exposure

Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS
ZnCl₂ is produced in minimum 80% purity; higher grades (>95%) are usual.

Amounts used: maximum 12500 T/y;

Frequency and duration of use: Continuous production

Environment factors not influenced by risk management

Flow rate of receiving surface water default: 18,000 m³/d, unless specified otherwise

Other given operational conditions affecting environmental exposure

- Most of the operations are in wet phase.
- Even when no process waters some non-process water can be generated containing zinc (e.g. from cleaning)
- All processes are performed indoor in a confined area. All residues containing zinc are recycled.

Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3 of SDS

Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS

Conditions and measures related to municipal sewage treatment plant

In cases where applicable, default size of the municipal STP (2000 m³/d), unless specified otherwise.

Conditions and measures related to external treatment of waste for disposal

If any, all hazardous wastes are treated by certified contractors according to EU and national legislation

Conditions and measures related to external recovery of waste

- All residues from the wet process are recycled.
- By-products (ashes) from the dry process that are formed in the reactor are recovered and either recycled in the system or handled further according to the waste legislation.
- Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life products
- Users of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according to the Waste regulation.

9.1.1.2 Contributing scenario (2) controlling worker exposure

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Product name:

ZINC CHLORIDE

Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS Zinc chloride is hygroscopic in nature and is produced in a dust-free crystalline form (5 mm). The dustiness of zinc chloride is very low. Total dustiness was measured by the modified Heubach Dust meter to be 1.14 mg/g, with 99.66% of the particles larger than 15.8 µm (RA 2008).
Amounts used: Maximum 96 T/day, 32T/shift
Frequency and duration of use/exposure: 8hrs shift
Human factors not influenced by risk management Uncovered body parts (potentially) face exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure All processes are carried out indoor in confined areas.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

ZnCl₂ GES-1: Industrial use of ZnCl₂ in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletising, sintering, possibly followed by packing
SU: 3, 10 PROC: 1, 2, 3, 4, 5, 8b, 9, 13, 14, 15, 22 PC: Not applicable AC: not applicable ERC: 1, 2
In the described process, the zinc chloride is: <ul style="list-style-type: none">• Removed from the packaging and stored in silos after delivery.• Extracted from the silo, dosed and fed with the other reagents to the mixing tank. Mixing occurs batch-wise or continuously, according the process receipt. The mixing occurs in a closed tank/chamber.• The preparation (dry or wet (solvent/paste) matrix) is further used as such or packed for further treatment/use.
Contributing scenario (1) controlling environmental exposure
Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl ₂ is used in minimum 80% purity; higher grades (>95%) are usual
Amounts used: maximum 5000 T/y;
Frequency and duration of use: Continuous production is assumed as a worst case
Environment factors not influenced by risk management

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Product name:

ZINC CHLORIDE

Flow rate of receiving surface water default: 18,000 m ³ /d, unless specified otherwise
Other given operational conditions affecting environmental exposure <ul style="list-style-type: none">All processes are performed indoor in a confined area. All residues containing zinc are recycled.Even when no process waters (e.g. when dry process throughout), some non-process water can be generated containing zinc (e.g. from cleaning)
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3. of SDS
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3. of SDS
Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m ³ /d), unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life productsUsers of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according to the Waste regulation.
Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to the waste legislation.
Contributing scenario (2) controlling worker exposure
Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS <ul style="list-style-type: none">The concentration of ZnCl₂ in the mixtures can cover a broad range (<= 5% up to >25%) depending on the application.The preparation can be solid or liquid.When the preparation is in solid state, it can be in a) powdery, b) glassy or c) pelletized form. In the powder form, it can be characterised by high dustiness in a worst case situation.
Amounts used: Max 5000T/y = 14T/d = 5T/shift depending on the application.
Frequency and duration of use/exposure: 8 hour shifts (default worst case) are assumed as starting point
Human factors not influenced by risk management Uncovered body parts (potentially) face can be exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure <ul style="list-style-type: none">elevated temperature steps (~100°C) can occurall indoor processes in confined area.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1. of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1. of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2. of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

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Product name:

ZINC CHLORIDE

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

GES ZnCl₂-2: industrial use of zinc chloride or ZnCl₂-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially filtering and packaging.
SU: 3, 8, 9, 10, 14, 15, 17, 0 (Nace C24.4.3., E38.3, C25.6.1.) PROC: 1, 2, 3, 5, 8b, 9, 13, 15, 21, 22, 23, 26 PC : 7, 14, 19, 20, 21, 24, 29, 39 AC : 2, 7, 12 ERC : 1, 2, 5, 6a
Description of activities/process(es) covered in the Exposure Scenario <ul style="list-style-type: none">• Reception of the ZnCl₂ or ZnCl₂-containing formulation, or ZnCl₂-bearing raw material in the reaction tank• Sequential addition of reagents for purification steps and filtration on press filter, when needed (ventilation is adapted).• Concentration by water evaporation, under exhaust hood, is optional.• Possible pouring on a cooling belt, is optional as well• Discharge and packaging of produced zinc compounds. Workers have to place and adjust the bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area.• Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m³ capacity), solid products are packed in bags or drums.• Maintenance activities
Contributing scenario (1) controlling environmental exposure
Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS Zn-compounds are produced in their pure form e.g.: > 99%, or in solution
Amounts used: Up to 75 T/d of ZnCl ₂ is transformed to equivalent Zn compound
Frequency and duration of use: Continuous production is assumed as a worst case
Environment factors not influenced by risk management: Flow rate of receiving surface water default: 18,000 m ³ /d, unless specified otherwise
Other given operational conditions affecting environmental exposure <ul style="list-style-type: none">• Wet processes (leaching, filtering, purification) followed by drying (possible grinding), and packaging;• All indoor processes, in confined area.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS <ul style="list-style-type: none">• Careful use of acids and corrosive solutions, if used• Sump containment is provided under the tanks and the filters i.o. to collect any accidental spillage• When applicable, process waters need to be specifically treated before release• Dosing and packaging operations occur under a special ventilation hood• Process air is filtered before release outside the building
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3. of SDS
Organizational measures to prevent/limit release from site: see section 8.2.3. of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: use default size of the municipal STP (2000 m ³ /d) unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">• If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.• Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life products• Users of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according to the Waste legislation.
Conditions and measures related to external recovery of waste By-products formed during the process are either recycled, internally or externally, or handled further as waste, according to the waste legislation.

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Product name:

ZINC CHLORIDE

Contributing scenario (2) controlling worker exposure
Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS <ul style="list-style-type: none">• Zinc chloride is transformed to equivalent pure zinc compound• The formed zinc compound can be produced as a powder with varying particle size (worst case scenario) or can be in solution.
Amounts used: Up to maximum 25T/shift
Frequency and duration of use/exposure: 8hrs shift (worst case)
Human factors not influenced by risk management Uncovered body parts: (potentially) face exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure All processes are carried out indoor in confined areas.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2. of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

GES ZnCl₂-3: Industrial and professional use of ZnCl₂ as active laboratory reagent in aqueous or organic media, for analysis or synthesis.
SU: 3,10, 22, 24 PROC: 1,2,3,4,5, 8a, 8b,9, 10, 15 PC: 19, 21, 28, 39 AC: not applicable ERC: 1,2, 4, 6a, 6b, 8a, 8b, 8d, 9a
The zinc chloride is used for <u>Analysis:</u> sample (solid or liquid) treatment or preparation: the substance is in the sample or in the reagents <u>Synthesis:</u> manipulations are usually under ventilation (e.g. laminar flow, ventilation hood) The substance is used at the industrial scale, in industrial installations for air control and water treatment and at the professional scale by laboratories
Contributing scenario (1) controlling environmental exposure
Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl ₂ is used in minimum 80% purity; higher grades (> 95%) are usual
Amounts used maximum 5 T/y (industrial scale) maximum 0.5 T/y (professional scale)
Frequency and duration of use: Use is usually intermittent but continuous use is assumed as a worst case

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Product name:

ZINC CHLORIDE

Environment factors not influenced by risk management Flow rate of receiving surface water default used: 18,000 m ³ /d, unless specified otherwise
Other given operational conditions affecting environmental exposure: All processes are performed indoor in a confined area, with dedicated laboratory equipment. All solid residues containing zinc are recovered for recycling.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3. of SDS
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil <ul style="list-style-type: none">Industrial scale: see section 8.2.3.Professional scale, the emissions are treated usually by STP. Professional services will be used for treating waste streams e.g. for the recovery of metallic solids (for recycling), and for the recovery of e.g. acid solutions containing the substance
Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m ³ /d) will be used unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life productsUsers of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according the Waste regulation.
Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to waste legislation
Contributing scenario (2) controlling worker exposure
Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS <ul style="list-style-type: none">ZnCl₂ is used in minimum 80% purity; higher grades (>95%) are usualThe sample can be solid or liquid.When the preparation is in solid state, it can be in a) powdery, b) glassy or c) pelletized form. In the powder form, it can be characterised by high dustiness in a worst case situation.
Amounts used <ul style="list-style-type: none">maximum 5 T/y (industrial scale)maximum 0.5 T/y (professional scale)
Frequency and duration of use/exposure: Use is usually intermittent but continuous use is assumed as a worst case
Human factors not influenced by risk management Uncovered body parts: (potentially) face can be exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure <ul style="list-style-type: none">high temperature steps can occur in protected zones (fume cupboards);all indoor processes in confined area, including hazardous substances cabinets.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS For laboratories more specifically: <ul style="list-style-type: none">Local exhaust ventilation on work areas with potential generation of dust or fumes, dust capturing and removal techniques (fume cupboards).Containment of liquid volumes and collection in special circuitsStorage of Zn products in dedicated zones, e.g.: hazardous substances cabinets
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS For laboratories more specifically: <ul style="list-style-type: none">Cleaning of process equipment and laboratoryStorage of Zn products in dedicated zones, e.g.: hazardous substances cabinets
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS

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Product name:

ZINC CHLORIDE

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

GES ZnCl₂-4: Industrial use of ZnCl₂ or ZnCl₂ - formulations as component for the manufacture of solid blends and matrices for further downstream use.
SU: 1, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 0 (Nace C21.1., 23.9.9., 26.1.1., 27.2.) PROC: 1, 2, 3, 4, 5, 8b, 9, 13, 14, 15, 22, 25, 26 PC: 1, 8, 9a, 9b, 9c, 14, 15, 18, 19, 20, 21, 26, 28, 29, 32, 35, 37, 38 AC: 2, 3, 4 - ERC: 1, 2, 3, 4, 5, 7, 8a, 8b, 8d, 10a, 10b, 11a
In the described process, the ZnCl ₂ (or Zn compound) containing preparation/mixture is optionally: <ul style="list-style-type: none">• Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature• Molten at high temperature (>500°C) and further cast as glassy material• Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use
Contributing scenario (1) controlling environmental exposure
Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl ₂ (or Zn compound) in the preparation can be > 25%, usually <5%
Amounts used: maximum 5000 T/y;
Frequency and duration of use: Continuous production is assumed as a worst case
Environment factors not influenced by risk management Flow rate of receiving surface water default value 18,000 m ³ /d used unless specified otherwise
Other given operational conditions affecting environmental exposure <ul style="list-style-type: none">• All dry processes throughout, no process waters. Even when no process waters occur (with dry process throughout), some non-process water can be generated containing zinc (e.g. from cleaning)• High temperature steps are possible.• All processes are performed indoor in a confined area. All residues containing zinc are recycled.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3 of SDS No process waters, so possible emissions to water are limited and non-process related
Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m ³ /d) will be used unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">• If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.• Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life products• Users of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according to the Waste legislation.

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Product name:

ZINC CHLORIDE

Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to the waste legislation.
Contributing scenario (2) controlling worker exposure
Product characteristic: see section 3 & 9 of SDS <ul style="list-style-type: none">The concentration of ZnCl₂ in the mixtures can be up to >25% but is usually of the order of ≤ 5%, depending on the application.The preparation is in the solid state, usually with a low level of dustiness; however, powder forms can occur, the high dustiness is therefore applied as a worst case.
Amounts used Max 5000T/y = 15T/d = 5T/shift depending on the application.
Frequency and duration of use/exposure 8 hour shifts (default worst case) are assumed as starting point
Human factors not influenced by risk management Uncovered body parts (potentially) face can be exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure <ul style="list-style-type: none">Dry processes: dry operational conditions throughout the process; no process waters;high temperature steps can occur;Indoor processes in confined area.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

GES ZnCl₂-5: Industrial use of ZnCl₂ or ZnCl₂-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.
SU: 1, 3, 4, 5, 6b, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18, 19, 20, 0 (Nace C23.2., 23.9.9., 27.2) PROC: 1, 2, 3, 4, 5, 6, 7, 8b, 9, 10, 11, 13, 14, 19, 20, 21, 24, 25 PC: 4, 8, 8, 12, 23, 24, 25, 28, 29, 31, 32, 33, 34, 35, 37, 38, 39, 40 AC: 1, 2, 3, 5, 6, 7, 10, 11, 13 ERC: 1, 2, 3, 5, 6a, 6b, 6d, 8a, 8b, 8c, 8d, 8f, 9a, 9b, 10a, 10b, 11a
In the described process, the zinc sulphate containing preparation/mixture is: <ul style="list-style-type: none">unpacked and stored in silosExtracted from the silo, dosed and fed with the other reagents and/or solvents to the mixing tank, batch-wise or continuously, according the process receipt.The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use.
Contributing scenario (1) controlling environmental exposure

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Product name:

ZINC CHLORIDE

Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl ₂ in preparation can be > 25%
Amounts used: maximum 5000 T/y;
Frequency and duration of use: Continuous production is assumed as a worst case
Environment factors not influenced by risk management Flow rate of receiving surface water default value: 18,000 m ³ /d, unless specified otherwise
Other given operational conditions affecting environmental exposure <ul style="list-style-type: none">• In parallel, non-process water can be generated containing zinc (e.g. from cleaning)• All processes are performed indoor in a confined area.• All residues containing zinc are recycled.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3 of SDS
Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m ³ /d) will be used unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">• If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.• Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life products• Users of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according the Waste regulation.
Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to the waste legislation.
Fraction of used amount transferred to external waste treatment for recovery: specify type of suitable recovery operations for waste generated by workers uses, e.g. re-distillation of solvents, refinery process for lubricant waste, recovery of slags, heat recovery out-side waste incinerators; specify effectiveness of measure;
Contributing scenario (2) controlling worker exposure
Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS The concentration of ZnCl ₂ in the mixtures can be >25%, depending on the application The preparation is in the liquid state, as a paste or dispersion or other viscous or polymerized matrix, with a low level of dustiness; however, powder forms can occur, medium dustiness is therefore applied as a worst case
Amounts used: Max 5000T/y = 20 T/d = 7 T/shift depending of application.
Frequency and duration of use/exposure: 8 hour shifts (default worst case) are assumed as starting point
Human factors not influenced by risk management Uncovered body parts: (potentially) face can be exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure <ul style="list-style-type: none">• Wet processes• All indoor processes in confined area.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

EXPOSURE SCENARIOS

(according to Regulation (EC) No 1907/2006 of the European Parliament as amended by Regulation No 830/2015/EU)

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Product name:

ZINC CHLORIDE

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

GES ZnCl₂-6: Industrial and professional use of solid substrates containing less than 25%w/w of ZnCl₂.
SU: 3, 5, 6b, 9, 10, 16, 17, 18, 20, 22, 0 (Nace 23.9.9) PROC: 4, 5, 6, 8b, 9,10, 11, 13, 19 PC: 1, 8, 9a, 9b, 9c,14,15, 18 20, 21, 23, 25, 29, 34, 35, 39, AC: 1, 2, 3, 5, 6, 7, 0 (coatings for art and creative items) ERC: 3, 5, 8a, 8d, 10a, 11a
This scenario covers both the industrial scale processes and professional use. In the described process, the ZnCl ₂ containing preparation/mixture is further processed, involving potentially the following steps: <ul style="list-style-type: none">• Reception/unpacking of material• Final application, embedding, or shaping to produce the end product or article.
Contributing scenario (1) controlling environmental exposure
Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl ₂ (or Zn compound) in the article is < 25%
Amounts used Typical quantities for both Industrial and professional are 50T/y (typical), maximum 500T/y (in industrial setting).
Frequency and duration of use: Continuous production is assumed as a worst case
Environment factors not influenced by risk management Flow rate of receiving surface water default for generic scenario: 18,000 m ³ /d, unless specified otherwise
Other given operational conditions affecting environmental exposure <ul style="list-style-type: none">• Solid, so in principle all dry processes throughout, no process waters. Even when no process waters occur (with dry process throughout), some non-process water can be generated containing zinc (e.g. from cleaning)• In industrial and professional setting, all processes are performed indoor in a confined area. All residues containing zinc are recycled.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3 of SDS In industrial and professional setting, the following applies: <ul style="list-style-type: none">• No process waters, so possible emissions to water are limited and non-process related.• By exposure modelling it is predicted that at use quantities of >100T/y, refinement of the exposure assessment to water and sediment needs to be made (exposure assessment based on real measured data and local parameters). Treatment of the emissions to water may be needed under such conditions.
Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m ³ /d) used unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">• If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.• Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life products• Users of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according the Waste legislation.
Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to the waste legislation.

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Contributing scenario (2) controlling worker exposure
Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS The concentration of ZnCl ₂ (or Zn compound) in the mixture is < 25% The mixture is in the solid state, with a low level of dustiness; however, powder forms can occur, the medium dustiness is therefore applied as a worst case
Amounts used Typical quantities for both Industrial and professional are 50 T/y (typical), or 0.15 T/day, 0.05 T/shift Maximum use quantity is 500T/y (1.5T/d, 0.5T/shift) in industrial setting
Frequency and duration of use/exposure: 8 hour shifts (default worst case) are assumed as starting point
Human factors not influenced by risk management Uncovered body parts: (potentially) face can be exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure Industrial / Professional: <ul style="list-style-type: none">• Dry processes: dry operational conditions throughout the process; no process waters• indoor processes in confined area
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. Detailed guidance for evaluation of ES can be acquired via your supplier or from the ECHA website (guidance R14, R16). Environmental and human exposure can be measured or modelled (more information on tools available in SDS section 8.1.4.).

In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)

GES ZnCl₂-7: Industrial and professional use of dispersions, pastes and polymerised substrates containing less than 25%w/w of ZnCl₂.
SU: 5, 6, 9, 11, 12, 13, 15, 17, 18, 19, 20, 22 PROC: 7, 8a, 8b, 9, 10, 11, 13, 14, 17, 19, 21 PC: 1, 4, 8, 9, 14, 19, 20, 21, 24, 25, 28, 29, 31, 32, 35, 39 AC: 1, 2, 7, 11 ERC: 8a, 8c, 8d, 8f, 10a
This scenario covers both the industrial scale processes and professional use. In the described process, the ZnCl ₂ containing preparation/mixture is further processed, involving potentially the following steps: <ul style="list-style-type: none">• Reception/unpacking of material• Final application, spraying, embedding or to produce the end product or article.
Contributing scenario (1) controlling environmental exposure
Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl ₂ (or Zn compound) in the article is < 25%

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Amounts used Typical quantities for both industrial and professional are 50T/y (typical), maximum 500T/y (in industrial setting).
Frequency and duration of use: Continuous production is assumed as a worst case
Environment factors not influenced by risk management Flow rate of receiving surface water default for generic scenario: 18,000 m ³ /d, unless specified otherwise
Other given operational conditions affecting environmental exposure <ul style="list-style-type: none">Wet processes. All process and non-process waters should be recycled internally to a maximal extent. Even when no process waters occur, some non-process water can be generated containing zinc (e.g. from cleaning)In industrial and professional setting, all processes are performed in a confined area. All residues containing zinc are recycled.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3 of SDS By exposure modelling it is predicted that at use quantities of > 100T/y, refinement of the exposure assessment to water and sediment needs to be made (exposure assessment based on real measured data and local parameters). Treatment of the emissions to water may be needed under such conditions
Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS
Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m ³ /d) is used unless specified otherwise.
Conditions and measures related to external treatment of waste for disposal <ul style="list-style-type: none">If any, all hazardous wastes are treated by certified contractors according to EU and national legislation.Users of Zn and Zn-compounds have to favour the recycling channels of the end-of-life productsUsers of Zn and Zn-compounds have to minimize Zn-containing waste, promote recycling routes and, for the remaining, dispose the waste streams according the Waste legislation.
Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to waste legislation.
Contributing scenario (2) controlling worker exposure
Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS <ul style="list-style-type: none">Particles can occur sporadically, the low level of dustiness is basically applied.Most of the processes imply the use of solutions or pastes; the "solution status" is therefore taken as the worst case.
Amounts used <ul style="list-style-type: none">Typical quantities for both Industrial and professional are 50 T/y (typical), or 0.15 T/day, 0.05 T/shift.Maximum use quantity is 500T/y (1.5T/d, 0.5T/shift) in industrial setting
Frequency and duration of use/exposure: 8 hour shifts (default worst case) are assumed as starting point
Human factors not influenced by risk management Uncovered body parts: (potentially) face can be exposed as a result of the nature of the activity
Other given operational conditions affecting workers exposure Industrial / Professional: Wet processes, all indoor in confined area.
Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS
Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS
Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS
Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS

Exposure estimation and reference to its source: not relevant, refer to CSR.

Risks for workers and to the environment have to be assessed considering the PNECs and DNELs mentioned under SDS sections 8.1.4.

Guidance to DU to evaluate whether he works inside the boundaries set by the (G)ES.

Occupational exposure/environmental emissions

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In addition, bioavailability corrections can be integrated in the exposure assessment, if the environmental parameters that are needed for the calculations are documented (see SDS section 8.1.4.)