

Introduction to (short) Generic Exposure Scenarios (GES): ZnCl₂

For assessment of exposures at local scale, several generic exposure scenarios (GES) were developed in the chemical safety report (CSR) for each zinc substance. This was necessary because of the significant number of uses that was identified for each of the substances. The multitude of identified uses was assigned to the respective GES based on similarity of process, and , consequently, similarity in exposure and risk management measures. So, GES are relevant for the different identified uses that they group at the same time.

Approaches for local exposure assessment

- Assessment of workers exposure is related to the place /process the worker is involved in. The GES group different processes; exposure assessment is done using the worst case approach by considering full shift exposure at the workplace with highest potential for exposure. Risk management measures are specified accordingly.
- Environmental emissions (notably to water) are usually integrating the totality of emissions from a given site, and cannot be distinguished for each process. Therefore assessments in the GES are done for the site as a whole.

Shortened GES for annexing to the e-SDS

For reasons of clarity, shortened versions of the GES as documented in the CSR have been listed below. These shortened versions focus on a) operational conditions and b) risk management measures. Repetition of information contained in the SDS has been avoided by cross-referencing.

How to identify the GES related to a given use?

In table below, the generic exposure scenarios (GES) developed for ZnCl₂ are presented.

Table : Generic exposure scenarios (GES) for ZnCl₂ (ref : CSR ZnCl₂, version Nov 2010)

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	GES _{ZnCl₂} 6
7		DU of ZnCl ₂ -containing liquid & pasty preparations	GES _{ZnCl₂} 7

To facilitate the identification of the GES related to a given downstream use, the table below lists the different uses that were identified for ZnCl₂. In this table, the downstream user can look up its use(s) and find the corresponding GES for attachment to his e-SDS.

Table: Identified uses for ZnCl₂ and corresponding Generic Exposure Scenario (GES) (ref: CSR ZnCl₂ version Nov 2010)

IU number	Identified Use (IU) name	GES code
1	Zinc chloride recovery	GESZnCl2 0
2	Zinc chloride production and refining	GESZnCl2 0
6	Production of inorganic zinc compounds	GESZnCl2 2
7	Electrogalvanising	GESZnCl2 2
8	Electroplating	GESZnCl2 2
9	Zinc production by electrowinning	GESZnCl2 2
10	Production of Zinc chloride based fluxing agents	GESZnCl2 2
11	steel surface treatment prior to hot-dip galvanizing	GESZnCl2 4, GESZnCl2 5
12	Use of zinc chloride based fluxing agents before welding/soldering processes	GESZnCl2 6, Generic consumer/environment*
13	Laboratory reagent	GESZnCl2 3
14	Catalytic agent	GESZnCl2 2, GESZnCl2 3
15	Zinc production by pyrometallurgy	GESZnCl 2
16	Production of organic zinc compounds	GESZnCl2 2
17	Production of organic pigments	GESZnCl2 1, GESZnCl2 4
18	Production of coatings, paints, inks, enamels, varnishes	GESZnCl2 1, GESZnCl2 4
19	Formulation of abrasive material for tools	GESZnCl2 1, GESZnCl2 4
20	Component for paper coating or treatment for paper products	GESZnCl2 1, GESZnCl2 5
21	Use of ZnCl2 containing paper coatings	GESZnCl2 6
22	Textile and leather coating treatment	GESZnCl2 1, GESZnCl2 5
23	Use of ZnCl2 containing coatings for textile and leather	GESZnCl2 6
24	Additive in the manufacturing of electric-electronic components	GESZnCl2 1, GESZnCl2 4
25	Batteries /fuel cells	GESZnCl2 1, GESZnCl2 4, GESZnCl2 5
26	Component for production of rubber, resins and related preparations	GESZnCl2 1, GESZnCl2 5
27	Production of polymer-matrices, plastics and related preparations	GESZnCl2 1, GESZnCl2 5

IU number	Identified Use (IU) name	GES code
28	Additive / component for the production of Sealants / Adhesives / Mastics	GESZnCl2 1, GESZnCl2 5
29	Use of ZnCl2-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 ZnCl2-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 ZnCl2-containing Polishes / wax blends	GESZnCl2 7, Generic consumer/environment
34	Use of ZnCl2-containing catalysts	GESZnCl2 1, GESZnCl2 5
35	Additive component for production of de-icing products	GESZnCl2 1, GESZnCl2 5
36	Use of ZnCl2-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 ZnCl2-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 ZnCl2-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

* corresponds to "GES 8" in IUCLID

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

<p>Description of activities and processes covered in the exposure scenario:</p> <ul style="list-style-type: none"> • 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
<p>Contributing scenario (1) controlling environmental exposure</p>
<p>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.</p>
<p>Amounts used: maximum 12500 T/y;</p>
<p>Frequency and duration of use: Continuous production</p>
<p>Environment factors not influenced by risk management Flow rate of receiving surface water default: 18,000 m³/d, unless specified otherwise</p>
<p>Other given operational conditions affecting environmental exposure</p> <ul style="list-style-type: none"> • 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.
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3 of SDS</p>
<p>Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS</p>
<p>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.</p>
<p>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</p>
<p>Conditions and measures related to external recovery of waste</p> <ul style="list-style-type: none"> • 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.
<p>9.1.1.2 Contributing scenario (2) controlling worker exposure</p>
<p>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).</p>
<p>Amounts used: Maximum 96 T/day, 32T/shift</p>

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 to 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
Flow rate of receiving surface water default: 18,000 m ³ /d, unless specified otherwise

<p>Other given operational conditions affecting environmental exposure</p> <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)
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.3. of SDS</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: see section 8.2.3. of SDS</p>
<p>Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS</p>
<p>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.</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <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 regulation.
<p>Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to the waste legislation.</p>
<p>Contributing scenario (2) controlling worker exposure</p>
<p>Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS</p> <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.
<p>Amounts used: Max 5000T/y = 14T/d = 5T/shift depending on the application.</p>
<p>Frequency and duration of use/exposure: 8 hour shifts (default worst case) are assumed as starting point</p>
<p>Human factors not influenced by risk management Uncovered body parts (potentially) face can be exposed as a result of the nature of the activity</p>
<p>Other given operational conditions affecting workers exposure</p> <ul style="list-style-type: none"> • elevated temperature steps (~=100°C) can occur • all indoor processes in confined area.
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS</p>
<p>Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1. of SDS</p>
<p>Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1. of SDS</p>
<p>Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2. of SDS</p>

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 ZnCl₂-2: 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.

<p>Conditions and measures related to external treatment of waste for disposal</p> <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.
<p>Conditions and measures related to external recovery of waste</p> <p>By-products formed during the process are either recycled, internally or externally, or handled further as waste, according to the waste legislation.</p>
<p>Contributing scenario (2) controlling worker exposure</p>
<p>Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS</p> <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.
<p>Amounts used: Up to maximum 25T/shift</p>
<p>Frequency and duration of use/exposure: 8hrs shift (worst case)</p>
<p>Human factors not influenced by risk management</p> <p>Uncovered body parts: (potentially) face exposed as a result of the nature of the activity</p>
<p>Other given operational conditions affecting workers exposure</p> <p>All processes are carried out indoor in confined areas.</p>
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS</p>
<p>Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS</p>
<p>Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS</p>
<p>Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2. of SDS</p>

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

<p>The zinc chloride is used for</p> <p><u>Analysis</u>: sample (solid or liquid) treatment or preparation: the substance is in the sample or in the reagents</p> <p><u>Synthesis</u>: manipulations are usually under ventilation (e.g. laminar flow, ventilation hood)</p> <p>The substance is used at the industrial scale, in industrial installations for air control and water treatment and at the professional scale by laboratories</p>
<p>Contributing scenario (1) controlling environmental exposure</p>
<p>Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS</p> <p>ZnCl₂ is used in minimum 80% purity; higher grades (> 95%) are usual</p>
<p>Amounts used</p> <p>maximum 5 T/y (industrial scale)</p> <p>maximum 0.5 T/y (professional scale)</p>
<p>Frequency and duration of use: Use is usually intermittent but continuous use is assumed as a worst case</p>
<p>Environment factors not influenced by risk management</p> <p>Flow rate of receiving surface water default used: 18,000 m³/d, unless specified otherwise</p>
<p>Other given operational conditions affecting environmental exposure:</p> <p>All processes are performed indoor in a confined area, with dedicated laboratory equipment. All solid residues containing zinc are recovered for recycling.</p>
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.3. of SDS</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p> <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
<p>Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS</p>
<p>Conditions and measures related to municipal sewage treatment plant</p> <p>In cases where applicable: default size of the municipal STP (2000 m³/d) will be used unless specified otherwise.</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <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.
<p>Conditions and measures related to external recovery of waste</p> <p>All residues are recycled or handled and conveyed according to waste legislation</p>
<p>Contributing scenario (2) controlling worker exposure</p>
<p>Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS</p> <ul style="list-style-type: none"> • ZnCl₂ is used in minimum 80% purity; higher grades (>95%) are usual • The 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.
<p>Amounts used</p> <ul style="list-style-type: none"> • maximum 5 T/y (industrial scale) • maximum 0.5 T/y (professional scale)
<p>Frequency and duration of use/exposure: Use is usually intermittent but continuous use is assumed as a worst case</p>

<p>Human factors not influenced by risk management</p> <p>Uncovered body parts: (potentially) face can be exposed as a result of the nature of the activity</p>
<p>Other given operational conditions affecting workers exposure</p> <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.
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS</p> <p>For laboratories more specifically:</p> <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 circuits • Storage of Zn products in dedicated zones, e.g.: hazardous substances cabinets
<p>Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS</p> <p>For laboratories more specifically:</p> <ul style="list-style-type: none"> • Cleaning of process equipment and laboratory • Storage of Zn products in dedicated zones, e.g.: hazardous substances cabinets
<p>Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS</p>
<p>Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS</p>

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.)

<p>GES ZnCl₂-4: Industrial use of ZnCl₂ or ZnCl₂ - formulations as component for the manufacture of solid blends and matrices for further downstream use.</p>
<p>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.)</p> <p>PROC: 1, 2, 3, 4, 5, 8b, 9, 13, 14, 15, 22, 25, 26</p> <p>PC: 1, 8, 9a, 9b, 9c, 14, 15, 18, 19, 20, 21, 26, 28, 29, 32, 35, 37, 38</p> <p>AC: 2, 3, 4 -</p> <p>ERC: 1, 2, 3, 4, 5, 7, 8a, 8b, 8d, 10a, 10b, 11a</p>
<p>In the described process, the ZnCl₂ (or Zn compound) containing preparation/mixture is optionally:</p> <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 <p>And subsequently packed, or used as such, in further treatment/use</p>
<p>Contributing scenario (1) controlling environmental exposure</p>
<p>Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS</p>

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.
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 silos• Extracted 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
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

<p>legislation.</p> <ul style="list-style-type: none"> • 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.
<p>Conditions and measures related to external recovery of waste</p> <p>All residues are recycled or handled and conveyed according to the waste legislation.</p>
<p>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;</p>
<p>Contributing scenario (2) controlling worker exposure</p>
<p>Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS</p> <p>The concentration of ZnCl₂ in the mixtures can be >25%, depending on the application</p> <p>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</p>
<p>Amounts used: Max 5000T/y = 20 T/d = 7 T/shift depending of application.</p>
<p>Frequency and duration of use/exposure: 8 hour shifts (default worst case) are assumed as starting point</p>
<p>Human factors not influenced by risk management</p> <p>Uncovered body parts: (potentially) face can be exposed as a result of the nature of the activity</p>
<p>Other given operational conditions affecting workers exposure</p> <ul style="list-style-type: none"> • Wet processes • All indoor processes in confined area.
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.1 of SDS</p>
<p>Technical conditions and measures to control dispersion from source towards the worker: see section 8.2.1 of SDS</p>
<p>Organisational measures to prevent /limit releases, dispersion and exposure: see section 8.2.1 of SDS</p>
<p>Conditions and measures related to personal protection, hygiene and health evaluation: see section 8.2.2 of SDS</p>

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.)

<p>GES ZnCl₂-6: Industrial and professional use of solid substrates containing less than 25%w/w of ZnCl₂.</p>
<p>SU: 3, 5, 6b, 9, 10, 16, 17, 18, 20, 22, 0 (Nace 23.9.9)</p>
<p>PROC: 4, 5, 6, 8b, 9,10, 11, 13, 19</p>
<p>PC: 1, 8, 9a, 9b, 9c,14,15, 18 20, 21, 23, 25, 29, 34, 35, 39,</p>
<p>AC: 1, 2, 3, 5, 6, 7, 0 (coatings for art and creative items)</p>

ERC: 3, 5, 8a, 8d, 10a, 11a
<p>This scenario covers both the industrial scale processes and professional use. In the described process, the ZnCl₂ containing preparation/mixture is further processed, involving potentially the following steps:</p> <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
<p>Product characteristics: see sections 3 (composition) and 9 (phys-chem properties) of SDS ZnCl₂ (or Zn compound) in the article is < 25%</p>
<p>Amounts used Typical quantities for both Industrial and professional are 50T/y (typical), maximum 500T/y (in industrial setting).</p>
<p>Frequency and duration of use: Continuous production is assumed as a worst case</p>
<p>Environment factors not influenced by risk management Flow rate of receiving surface water default for generic scenario: 18,000 m³/d, unless specified otherwise</p>
<p>Other given operational conditions affecting environmental exposure</p> <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.
<p>Technical conditions and measures at process level (source) to prevent release: see section 8.2.3 of SDS</p>
<p>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:</p> <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.
<p>Organizational measures to prevent/limit release from site: see section 8.2.3 of SDS</p>
<p>Conditions and measures related to municipal sewage treatment plant In cases where applicable: default size of the municipal STP (2000 m³/d) used unless specified otherwise.</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <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.
<p>Conditions and measures related to external recovery of waste All residues are recycled or handled and conveyed according to the waste legislation.</p>
Contributing scenario (2) controlling worker exposure
<p>Product characteristic: see sections 3 (composition) and 9 (phys-chem properties) of SDS The concentration of ZnCl₂ (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</p>
<p>Amounts used Typical quantities for both Industrial and professional are 50 T/y (typical), or 0.15 T/day, 0.05 T/shift</p>

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%
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 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 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

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.)